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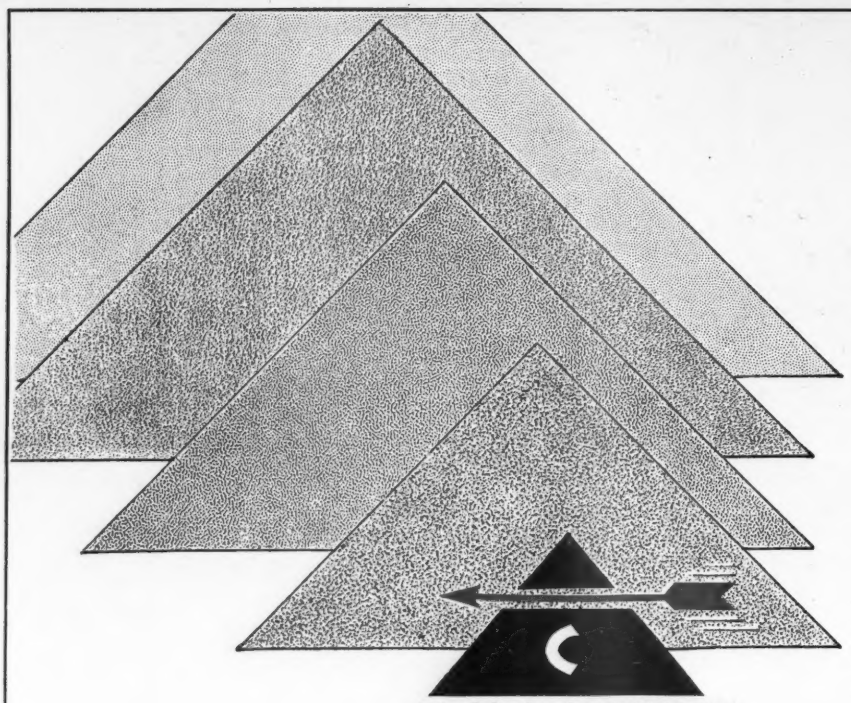

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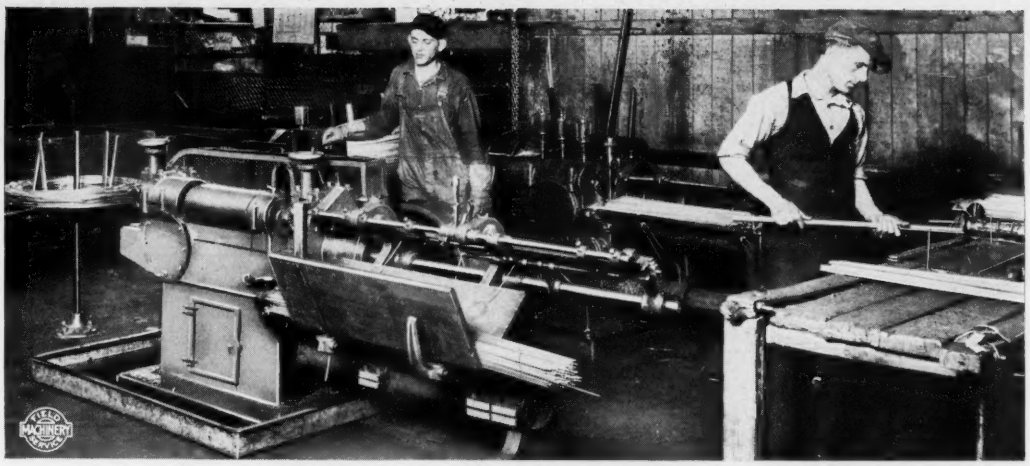

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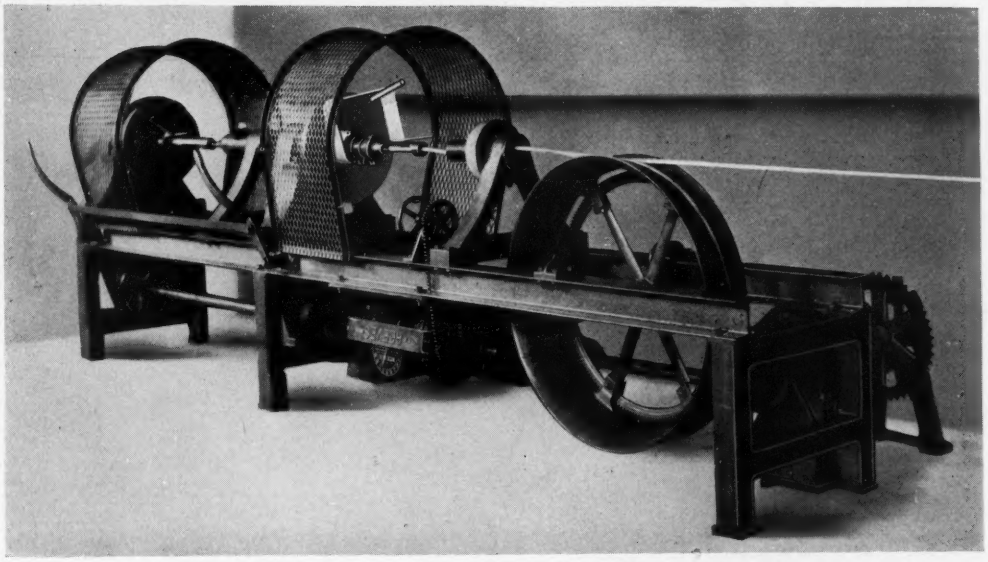

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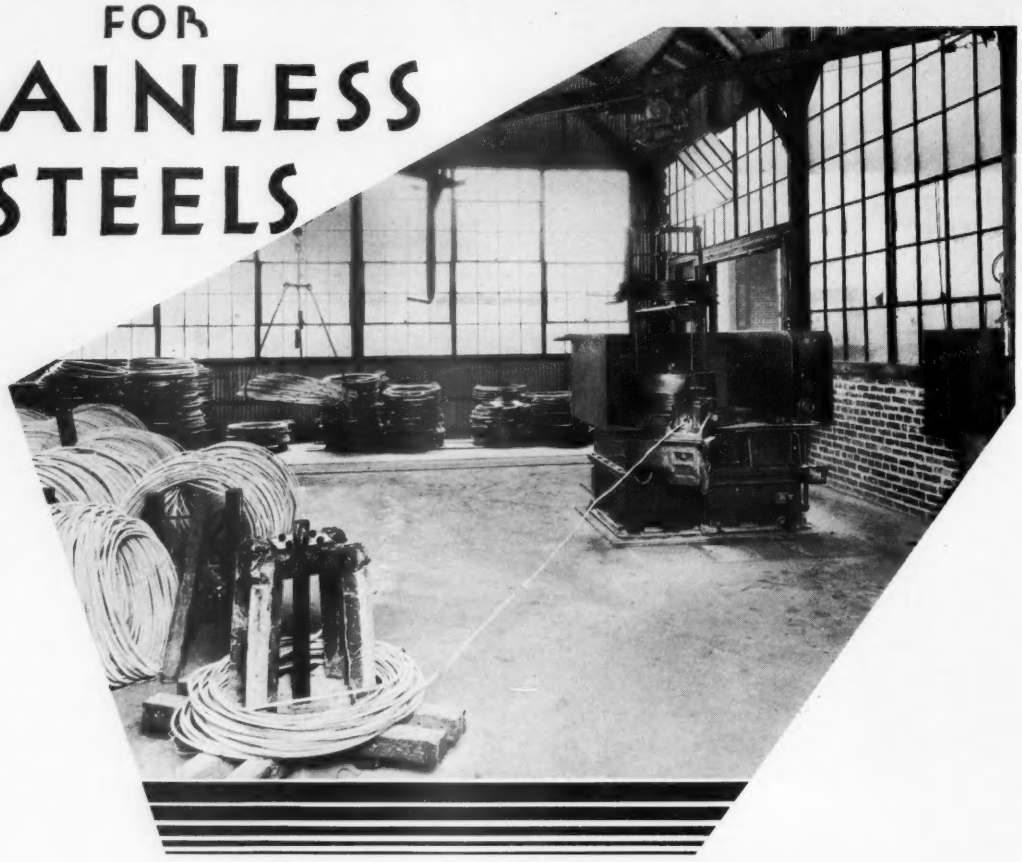

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WIRE & WIRE PRODUCTS

A monthly publication devoted to the production of Wire & Wire Products in all metals from the bar to the finished wire product.

Vol. 6 February 1931 No. 2

Official Publication of The Wire Association

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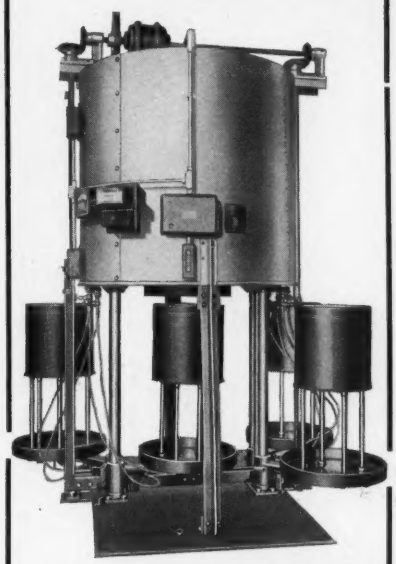

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A Monthly Publication Devoted to the Production of Wire and Wire Products in all Metals from the Bar to the Finished Wire Product.

Vol. 6 FEBRUARY, 1931 No. 2

Furnaces For Annealing, Galvanizing and Japanning Strip Steel

By J. B. Nealey*

Handling Hot and Cold Strip Continuously and Rapidly with Gas Fuel—Automatic Controls—Other Equipment ▼ ▼ ▼

ONE of the world's largest manufacturers of a full line of hot and cold rolled strip steel is the Acme Steel Co., Chicago, Ill., and its Riverdale works is a model in every respect including plant, equipment and layout. The main building is about 2,000 ft. long and contains a continuous hot strip mill and three batteries of box annealing furnaces. Other buildings contain hoop mill, merchant mill, cold mills and galvanizing. The hot strip mill consists of 12 stands of rolls two-high and rolls 10 ft. slabs 2½ in. thick and of various widths, the resulting product

*Amer. Gas. Assn., New York.

Fig. 1. Continuous Lead-annealing Furnace with Automatic Temperature Controls (Gas-fired). Note Rolls at Charging End which Pull the Strip Up from the Floor Below.

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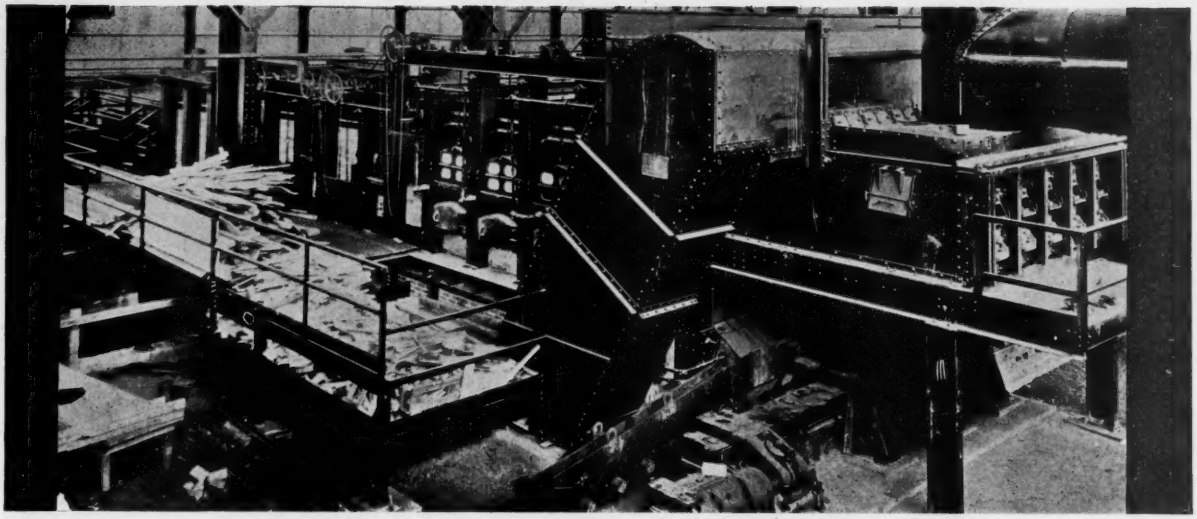

Fig. 2. Continuous Pusher-type Gas-fired Billet Heating Furnace Used with the Continuous Strip Mill.

ranging from 3 to 20 in. in width and .049 to .440 in. in thickness.

The hoop mill, for hot rolled hoop steel, contains eleven strands of rolls two-high and the product from this mill is between 1 and 3½ in. wide, and .025 and .140 in. thick. One of the cold mills rolling box band contains twelve mills two-high set in four stands. The product ranges from 1 to 2½ in. wide, and .010 to .045 in. thick. The other cold mill, for strip, has sixteen mills set in four stands per train. Three of these trains are 10 in., 12 in. and 16 in. respectively and produce strip from 1½ to 20 in. wide, and from .002 to .250 in. thick. A finishing mill of each side is set separately from the trains. Both medium and low carbon steels are used.

Continuous and Automatic

ONE of the most interesting features in this plant is an installation which takes the strip steel and anneals, cools, pickles, washes and galvanizes continuously, automatically and at a high rate of speed. This installation sets on two floors and there are eighteen reels for the coiled strip to unwind from, which are located on the second floor.

From these the strands of strip run through a gas-fired lead pot where they are annealed. This pot or kettle is in reality a shallow pan of cast steel, 15 ft. long, 4 ft. wide and 6 in. deep. It is fixed in a brick setting which acts as a furnace and is 19 ft. long, 6½ ft. wide and 4 ft. high. The furnace is steel encased and has

(*Please turn to page 75*)

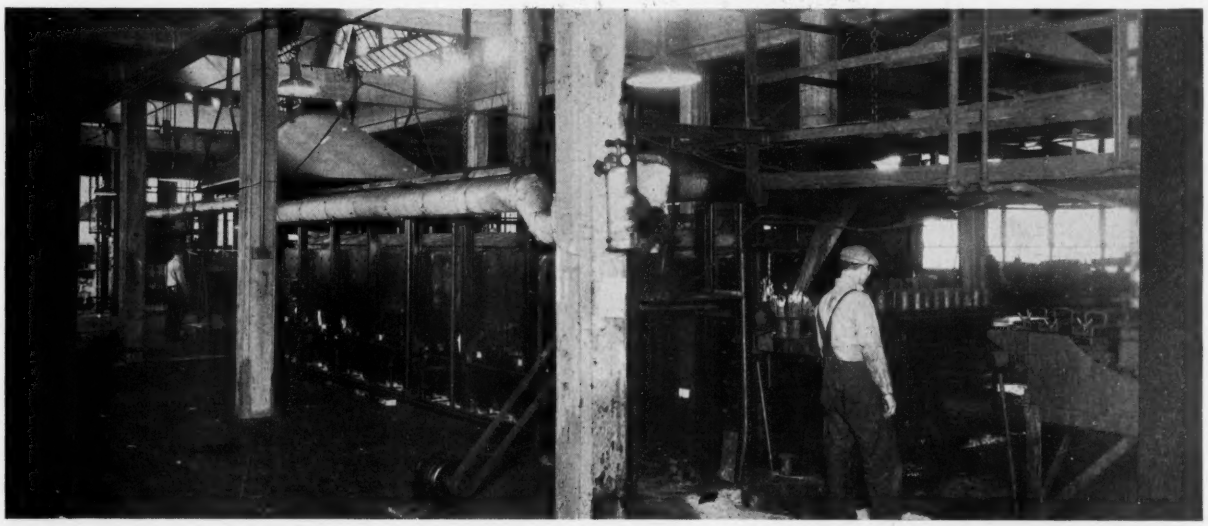

Fig. 3. Continuous Paint-baking Furnace with Continuous Lead Annealing in Background with Gas-fired. Strips Come from Floor Below, Pass Through Lead Pot Furnace, Pass Through Pipe Filled with Row Gas (Note Pipe Just Above Furnace) Through Paint Bath Shown at Extreme Right, Through Wipers, Through Paint Baking Furnace, Then Down to Floor Below, Where Wound Into Coils for Shipment.

Advantages And Disadvantages of Different Types of Hot Galvanizing Furnaces

Wallace G. Imhoff*

Influence of Kind of Work On Pots--Correct Determination of Best Fuel--Other Data and Costs

THE broad extent of the field of hot galvanizing can only be appreciated by very close contact with the many problems that arise in the different branches of the industry. Any one particular phase could be made the subject of a small treatise. It would probably be more appropriate to say, "The Type of Furnace Required for Various Kinds of Hot Galvanizing" instead of "The Advantages and Disadvantages of Different Types of Furnaces for Hot Galvanizing". However a short discussion will probably cover both of these titles, as it is the manner in which the material is presented that determines the viewpoint.

There are two things that determine the type of the furnace to be used for hot galvanizing and these apply equally to wire. These are:

1. The kind of work that is to be coated.

2. The fuel used to heat the pot.

The kind of work to be coated determines the size, shape, and general dimensions of the pot; the kind of fuel used determines the furnace design to heat the pot. These points are very well shown by the illustrations of galvanizing pots for three different kinds of work. A very large galvanizing pot, shown in Fig. 1, is 35 ft. long, by 40 in. wide, by 48 in. deep. The sides are of 1¾ in. plates, and the bottom and ends are of 1¼ in. plate.

The weight of this pot is 17 tons. A kettle of this size is used for galvanizing very long structural work such as beams, angles, channels, etc., for high tension towers, or steel for electric switching stations, long pipe, or articles of a similar kind requiring such a long kettle to completely submerge the entire piece at one time. While not wholly suitable for wire, this pot could be so used with little change.

Galvanizing Pots Planned for Drainage

A VERY strong contrast in the character of the galvanizing pot is shown in Fig. 3. This type of a pot is used for hot galvanizing spouting, eaves troughs, etc. that must be drawn out of the pot vertically so that the metal can drain off properly and give a smooth finish. These pots are 12 ft. deep, 30 in. in diameter, and made of 1-¼ in. stock. The bottom is forged lap welded, and the center seam is hammer welded.

A still different type of pot is illustrated in Fig 2. This particular pan is 48 in. wide, by 28 in. deep. The inside length is 28 ft. 2 in. All the plates are one inch special galvanizing steel. The angles are 6x4x¾ in. on each side at the top, and the pan has a double head in each end. Such a pot is used for shallow work that has to be immersed in the metal for a considerable length. Wire, strips, band steel, and the like might be coated in this type of pot.

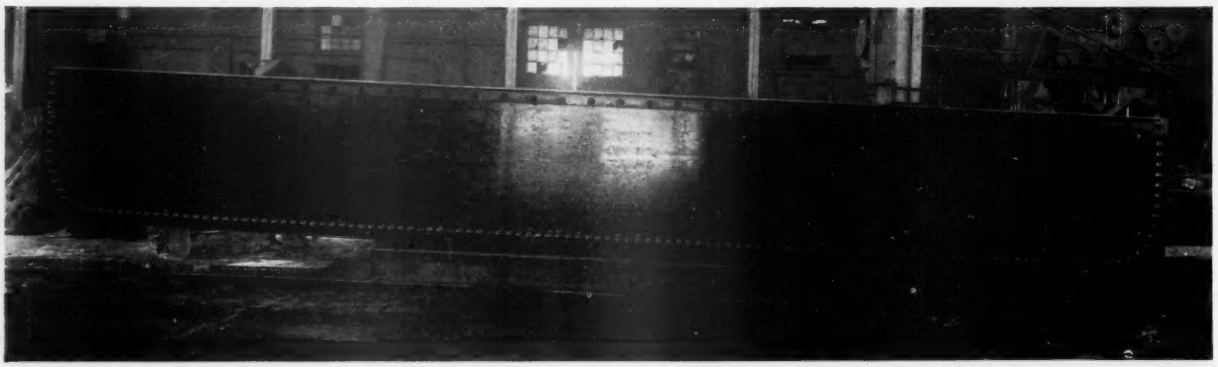

Fig. 1. A Very Large Galvanizing Pot Suitable for Long Structural Beams, Pipe, and Work of a Similar Nature. (Courtesy of National Wrought Iron Annealing Box Co., Washington, Pa.)

*President of The Wallace G. Imhoff Co., Consultants in Zinc Coating (Hot Galvanizing) Vineland, N. J.

These three types illustrate very clearly the diversity of range in the manufacture of galvanizing pots alone and call to attention at once the care, the practical experience, and the knowledge of galvanizing conditions that the kettle maker is called upon to meet. They bring out how necessary it is for the buyer to co-operate closely with the pot manufacturer, so that all the details to insure success may be supplied to him. As stated before, the subject of the relation of kind of work to be coated as influencing kettle design, is a field in itself for study. Then in addition to this there is the relation of kettle design as influenced by the type of fuel used. Time will not permit more than to call these facts to attention here.

Relations of Pot to Work Done ▾ ▾ ▾ ▾ ▾ ▾ ▾

SOME conditions are flexible and other conditions are very rigid and cannot be changed. For example, an 18-ft. beam can be coated in a 10-ft. pot but only half of it can be coated at a time, the pickling and handling conditions are difficult, and the quality of the finished job shows the disadvantages of coating in the short pot. To be done right the fixed conditions would require a 20-ft. pot where the entire beam could be coated at the same time. This is just one illustration of the relation of the type of pot to the work being coated. The practical question is—"Can this knowledge of conditions be organized and systematized?"

An attempt to show the advantages and disadvantages of different types of hot galvanizing furnaces is best brought out by definitely organizing the conditions necessary for successful operation of the various types of furnaces. It has been mentioned that the kind of pot, its shape, size, and general dimensions are largely determined by the kind of work that is to be coated. This has been very clearly shown in the illustrations of different pots.

The second question which is the relation of the pot to the fuel selected for heating it, is still more complicated because there are five different fuels used for heating hot galvanizing kettles. Here again the subject is so complex that no attempt will be made to go into details. A short organized summary will present the matter in a very much clearer, simpler manner.

The fuels are—

Coal	Oil
Coke	Electricity
Gas	

Advantages and disadvantages are based upon six fundamental factors of plant management which are as follows:

1. Overall costs
2. Life of the equipment
3. Fuel efficiency
4. Ease of operation; flexibility; production
5. By-products produced
6. Quality of the product

The proper sequence would show "Quality of the Product" first, because after all if the quality is such that the product is not saleable, then all operations are soon stopped. A very glaring example, however, of an attempt to overlook this fact was seen during and after the war, when production was first, and quality of the product came away down the list. The revised order as found today is—

1. Overall costs
2. Quality of the product
3. Ease of operation; flexibility; production
4. Life of the equipment
5. By-Products produced
6. Fuel efficiency

From the factory standpoint these are the important facts which must be met by any fuel for heating galvanizing furnaces; the overall cost must be low; that is within the usual competitive range; the quality of the product must be average or above average to take its place on the open market with other articles of the same type; the ease of operation must be such that production is not interrupted continually; the life of the equipment must be considered as average for the industry, or the kind of fuel used; the by-products made must not be excessively high; and the fuel must be burned with at least a fair degree of efficiency.

How Fuel Is Determined

IN selecting a fuel, many things must be taken into consideration, and it might be stated at the outset that in-so-far as hot galvanizing is concerned, no fuel is better than any other fuel for heating the pot, if the furnace is so designed to meet the exact requirements of galvanizing principles. This brings into the foreground a third and very important factor in considering the advantages and disadvantages of various types of hot galvanizing furnaces. In order to firmly fix these factors in mind they will be shown again below with the third factor added—

1. The kind of work to be coated
2. The kind of fuel used to

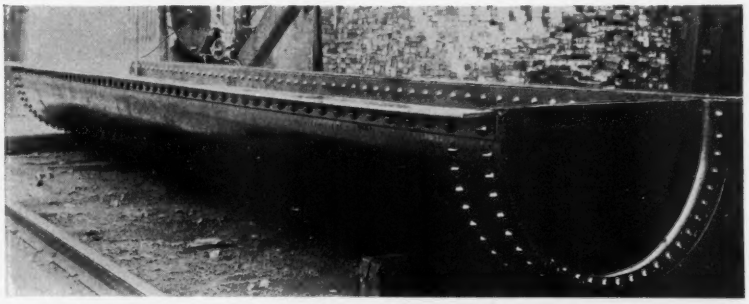

Fig. 2. Shallow Galvanizing Pot Such as Might Be Used for Wire, Band and Strip Steel. (Courtesy of The Columbiana Boiler Co., Columbiana, O.) ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦

heat the pot

3. How close the furnace meets the required hot galvanizing principles

A most important factor of both furnace design and choice of fuel, is the matter of selecting a fuel which will match up with most of the plant conditions already established over many years of time. Occasionally it does pay to scrap all the old equipment and methods and begin on a new basis, but this is not always possible or the best thing to do. Since the kind of work to be coated and the fuel used determine the pot and furnace designs, then the matter of advantages and disadvantages largely simmers down to selecting the nearest set of conditions that will match up with present plant conditions. The basis for the choice of fuel, and some fuel requirements are listed below:

1. It must be reasonable in cost.
2. It must be easily adapted to the kind of work.

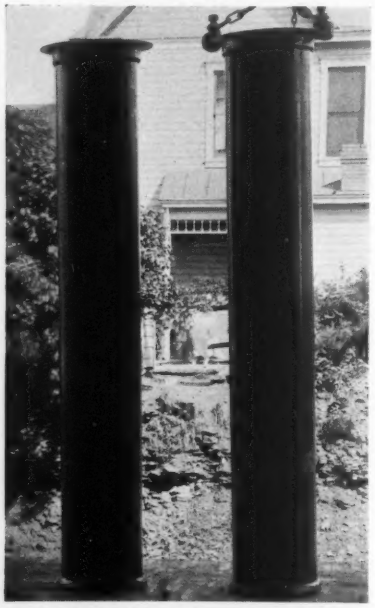

Fig. 3. Small Round Deep Pot Suitable for Zinc Coating Such Work as Spouting, Eves, Troughs, etc. (Courtesy of National Wrought Iron Annealing Box Co., Washington, Pa.)

3. The fire hazard must be considered.
4. Its application must not radically violate galvanizing principles.
5. The up-keep and repair must be low.
6. The first cost of installation must be reasonable.
7. The cost of fuel after routine practice has been established must be reasonable.
8. Dirt, ashes, smoke, etc. must be considered.
9. The b.t.u. value must be considered.
10. The plant conditions already established should be taken into account.
11. The type of labor using the fuel.
12. The nearness to the source of supply.
13. The degree of specialization and knowledge already available in handling any particular fuel.
14. The prejudice that has to be overcome.
15. Necessary changes involved in changing fuels.
16. Relation of fuel to furnace design and kind of work.
17. Ease of control.
18. Service and general attitude of companies supplying the fuel.
19. The attitude of the management toward the fuel.
20. The final results obtained in the costs of the manufactured product.

The factors just listed summarize the situation of fuel selection. The type of furnace selected depends upon which fuel will match up with the most of these conditions. This then will determine the advantages and disadvantages of the furnace to a very large extent. Soft coal has been used successfully but due to the many disadvantages of this type of fuel there are only a few furnaces left that still use this type of fuel. Coke has been used for many years and is still widely used throughout the industry. One of the main disadvantages of coke-fired furnaces is that they lose their heat, and are not very flexible. Natural gas, city gas, and coke oven gas are also used as fuels for heating galvanizing pots and each one requires definite study to operate with any degree of success. Natural gas has a high b.t.u. value, and while it has the advantage of being extremely flexible, that advantage may be used to a disadvantage in quick destruction of the pot itself by radi-

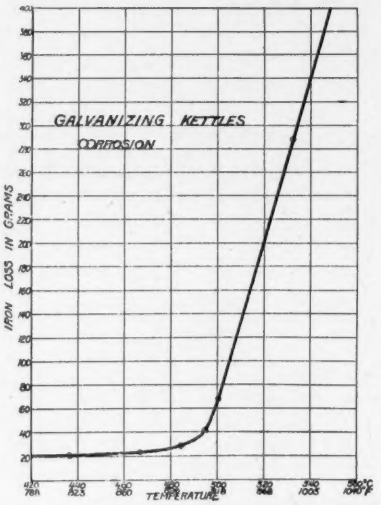

Chart Showing Corrosion of Galvanizing Kettles in Grams According to Increase in Temperature. These Results of the Industrial Research Investigation of Mellon Institute Indicate a Very Sharp Increase in Corrosion Above 500 Deg. C.

cal variations in temperature. Fuel oil has a very high b.t.u. value and requires even more study to obtain successful results. The most of the successful installations of fuel oil are the ones that have used this fuel over a long period of years, and are familiar with the details of how to handle it. Explosions and fire hazard are present to a larger extent with gas and oil than with the other fuels. Electricity is rapidly entering the field of galvanizing due to its ideal characteristics of accurate control and even heat distribution. These two factors are perhaps the most important in determining the life of the equipment, and the quantity of by-products produced, as well as the quality of the work turned out. The cost is two to three times that of the other fuels, but the advantages in cleanliness, control, heat distribution, quantity of products produced, and quality of the product in a large way off-set the difference in the price of the fuels. There were about 15 electrically heated hot galvanizing furnaces in the country in 1929.

(Please turn to page 72)

Furnaces for Heat Treatment of High-Duty Bearing Balls

By R. E. Coward

Forming Balls from Steel Wire and Rod--Hardening, Quenching, Tempering--Advantages of Automatic Rotary Furnaces

PROPER heat treatment is undoubtedly the factor of greatest importance in the manufacture of High-duty bearing balls, this referring to the handling of the steel from which the balls are made as well as to the balls after forming. The quality of the steel used in balls is second only in importance to the proper heat treatment. Through many years of research and testing, the manufacturers of balls have found that an alloy steel containing chromium is the most suitable for the purpose. Chromium steel of a high grade, properly heat treated, presents the greatest resistance to the variable stresses set up in high-duty bearing applications.

Ball steel, as we will term this material, contains aproximately 1.00% carbon, with chromium ranging .50% to 1.5%. The chromium varies with the ball size to insure hardness penetration to the center. Manganese and silicon usually range from .25% to .35%, while the phosphorous and sulphur content should note exceed .025%. Steel of this type must show a chromium if pipes, seams, slag inclusions, etc. Whether in the form of wire or rods, ball steel must be supplied with a fine structure of granular pearlite, free from lamellar pearlite and cementite boundaries.

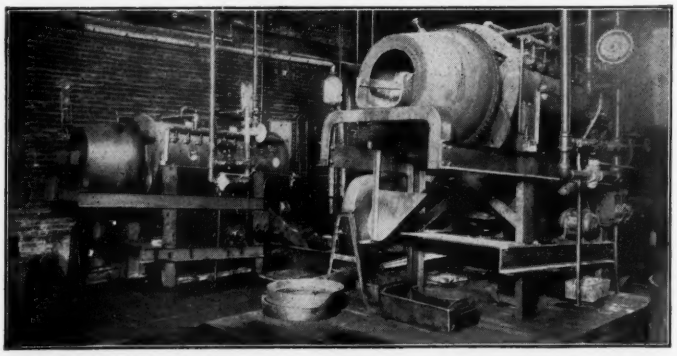

Fig. 1. Rotary Furnaces Are Used for Hardening.

The general procedure of heat treatment, after the balls are formed, is to first anneal the work in order to relieve stresses set up in the preliminary forming operation and also to give a uniform structure to the material. After the normalizing operation, the balls are hardened by heating to the proper temperatures and then quenching in either water or oil. This quenching sets up severe strains which must be relieved by a subsequent tempering operation.

Forming All Size Balls

GENERALLY speaking, steel balls are formed by either cold or hot pressing. Small balls are cold pressed from ball steel supplied in the form of cold drawn and annealed wire, while larger size balls are hot pressed from cold drawn or hot rolled annealed ball steel supplied in rod form. Both operations require the steel to be cut into slugs, which vary with the ball size. These slugs are then carried between two semi-hemispherical dies and pressed into balls. After forming the rough balls are ground in specially designed machines in order to remove the excess surface material and at the same time bring all the balls to a uniform size and sphericity within approximately .002 in. Sufficient material is always allowed on the work, after this grinding operation, for surface decarburization in heat treating and for rounding up the balls in the grinding operations that follow.

Hardening, Quenching and Tempering

MANY types of furnaces are employed for heat treating high-duty steel bearing balls. Generally speaking, however, the continuous, gas fired, rotary furnace is used for small balls, while the large balls are heat treated in standard stationary oven furnaces.

There are also many methods of quenching employed, but the two most popular and the most successful are the deep quench and the rotating drum type. Medium and large balls are quenched in water, while small balls— under ¼ in.—are always quenched in oil, water being too severe for their small cross-section.

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After quenching, the balls are rather brittle, having a Rockwell hardness of 67 C to 68 C. In this condition they fail to possess the greatest resistance to fatigue. It is therefor, necessary to reduce this hardness to some extent by tempering.

Tempering bearing balls is accomplished by agitating the ball mass in heated oil at a constant temperature, which temperature is automatically controlled, or in automatically controlled heated air circulating through the work. Generally, the balls are heated to a temperature ranging from 275° to 325° F. (135° to 163° C.) and held for approximately one hour. This time may vary slightly according to the ball size and the analysis of the steel. After this operation the balls will show a desired Rockwell hardness of 64 C to 66 C and still be file hard.

Rotary Furnaces Have Many Advantages ▾ ▾ ▾

THE modern gas fired, rotary type furnaces with automatic gas control are shown in Fig. 1. The furnace to the left uses the deep-quench method, while the one on the dight discharges the balls into the quench beneath, more clearly shown in Fig. 3.

The rotary furnace is cylindrically shaped, containing a rotating heat-resisting metal retort with an internal helical spiral. The furnace is either side or end fired. The most satisfactory furnaces of this type are side fired, using gas as a fuel.

The steel balls are loaded into a rotating, conical container mounted on the cold end of the furnace. This container is equipped with a pocket which can be regulated to pick up the desired quantity of balls at each revolution. Thus the proper load is insured, which is so necessary for uniform heat treating.

The steel balls leave the pocket of the revolving container and enter the rotating, heat-resisting metal retort, where they are carried forward, following the helical spiral, into increasingly hotter areas until they are brought to the required temperature. A variable speed transmission which controls the speed of the retort permits the proper period of time to be given balls of various sizes. At this point it might be well to state that rotary furnaces are particularly adapted for hardening balls because each ball is subject to a constant and definite temperature for a pre-prescribed period of time, thus producing a uniformity of structure throughout the entire ball.

Small steel balls, under one inch in diameter, are usually heat treated in rotary furnaces. In normalizing, the balls are brought to a temperature of 1300° F. (704°C.) and then allowed to cool slowly in covered receptacles. The same furnaces are employed for the hardening process. In this operation, the work is subjected to a temperature ranging from 1480° to 1500° F. (805° to 815° C.) and quenched.

Stationary Furnaces Used for Large Balls ▾ ▾

STEEL balls larger than one inch in diameter require longer periods of time at soaking temperature, and are, therefore, usually heated in square, oven furnaces of the reverberatory type. Fig. 2 illustrates a battery.

The hot pressing operation used for forming the larger balls destroys the original structure of the steel as received. To obtain this desired structure again, the balls are normalized in these square furnaces at a temperature of 1380° F. (750° C.) and held until all the carbides have been taken into solution, after which they are allowed to slowly cool. Thus the steel is restored to a granular pearlitic condition. These furnaces are also employed for hardening the larger size balls. In this operation the balls are gradually brought to a temperature ranging between 1480° and 1510° F. (805° to 820° C.), dependent upon the ball size and the analysis of the steel. They are held at this temperature from 1 to 2 hours. It is customary to oil fire furnaces of this design. Careful control is accomplished by indicating and recording potentiometers.

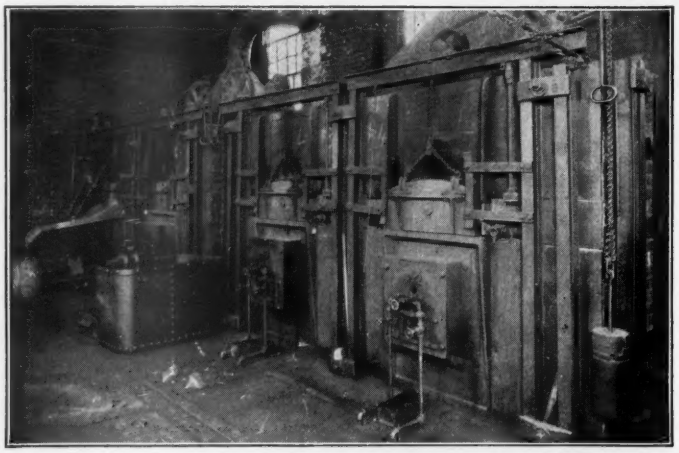
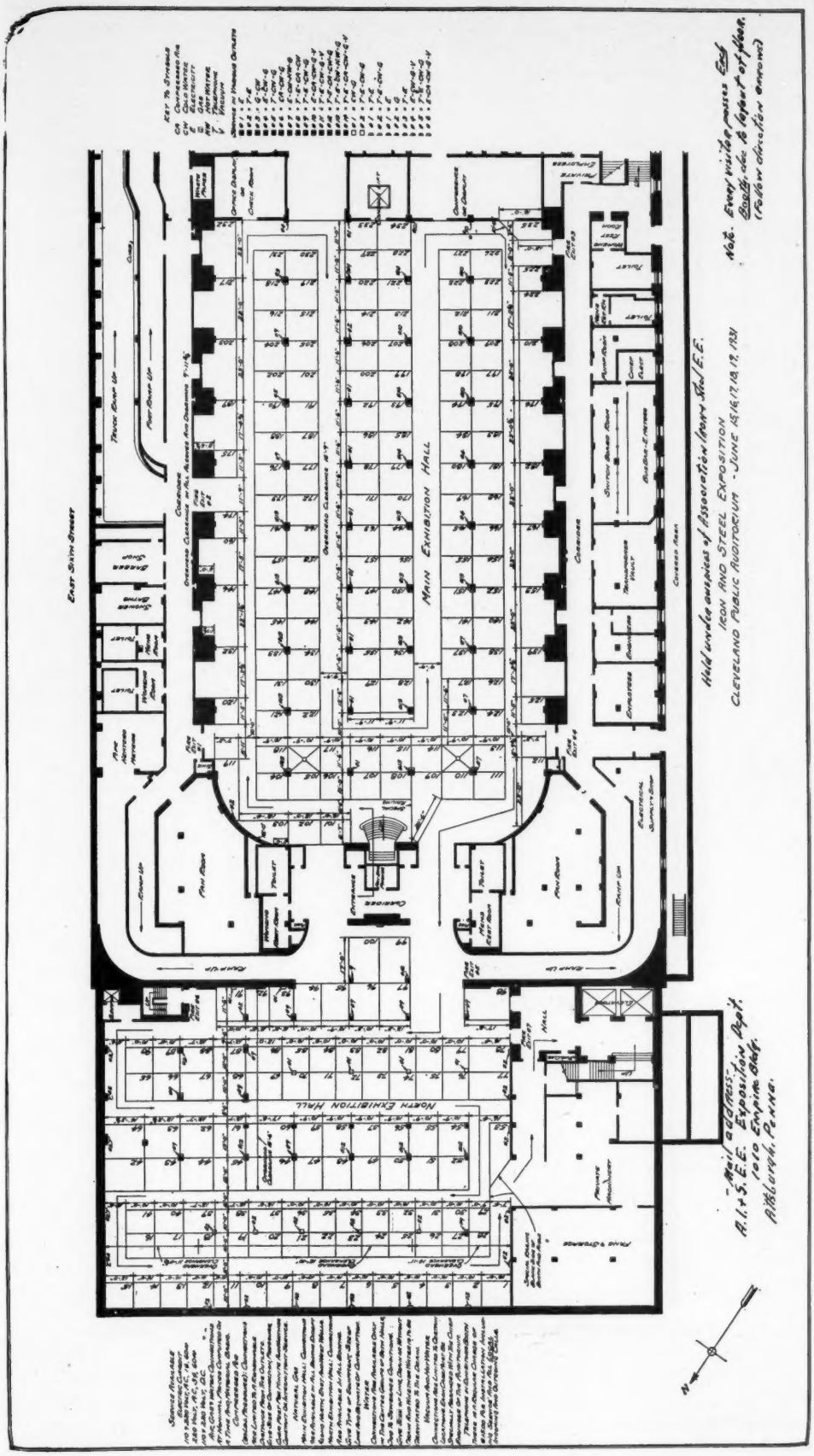


Fig. 2. Balls More Than 1 in. in Diameter Are Normalized and Hardened in Oven Furnaces.

Quenching Furnaces ▾ ▾

TO give a clearer understanding of the drum type quenching method Fig. 3 is shown. A rotary cylinder with an internal helical spiral constitutes the assembly. The unit is partially immersed in water, and receives the balls as they are discharged, in a heated state, from either the rotary or stationary oven furnaces. The balls, following the internal spiral, move forward as the cylinder revolves. Thus, the work is constantly agitated and is cooled to water temperature by the time it

(*Please turn to page 70*)


MAIN EXHIBITION HALL
NORTH EXHIBITION HALL
EAST SIXTH STREET
Note: Every visitor passes each booth, etc. in report of floor. (Below direction arrows)
Wire and cable empires of Association Iron and Steel E.E.
IRON AND STEEL EXPOSITION
CLEVELAND PUBLIC AUDITORIUM - JUNE 15 16 17 18 19 1931
Mail address
A.I. & S.E.E. Exposition Dept.
1010 Empire Bldg.
Pittsburgh, Pa. U.S.A.

Wire Show and Convention

Big Things Planned for Cleveland Meeting and Big Crowd Promised ▾

AT the second annual wire show and exposition to be held in the Cleveland Public Auditorium, June 15-19, even more displays than at Buffalo are promised. The reservations for show space at the exposition already made, and additional inquiries, as well as the wide interest manifested, seem to indicate that the wire industry has passed the low point and is looking forward to this as the opportunity to prove that prosperity is with us and all is well with wire people.

Preliminary plans for the convention of wire executives are going forward rapidly and one splendid talk on a subject of widest interest has been secured from a prominent consulting engineer. Other papers are tentatively promised, while most of the men prominent in the industry have signified their intentions of being present, and participating.

The management assures all wire men that a larger hall will be secured for the technical sessions than was available at Buffalo, and more and better arrangements made for personal comfort therein. It is confidently expected that last year's attendance records will be broken, at both show and technical sessions.

Within the Auditorium the entire east end, at the extreme right end of the building, has been reserved for the wire section. Present indications are that it will be inadequate.

Wire Questions and Answers

Question No. 2--Tight Copper Coating on Steel Wire ▼ ▼ ▼

The Wire Association:

We have recently taken up the manufacture of copper coated steel wire, but we are having trouble in getting a tight coating.

Our method of manufacture is to draw the wire in the ordinary way down to one gage heavier than the finished product. On 12 gage coppered wire, for instance, we draw down to 11 gage, anneal the wire, clean it and keeping the wire wet from the cleaning, put it into our solution of copper sulphate. This copper sulphate is in a wooden vat and besides containing water and copper sulphate, it also includes a mixture of tallow and acid. The tallow used is a stiff quality edible tallow, thinned down with sulphuric acid. The wire remains in the copper sulphate about 15 minutes, after which it is drawn down to 11½ gage. Then it goes back in the copper sulphate for another 15 minutes and is drawn down to 12 gage. This gives a nice looking coppered wire but it will not stand any bending or forming. The coating flakes off so easily that there is quite evidently something missing in our mixture, and there is no good bond between the steel and the copper.

Answer No. 1

The Wire Association:

Regarding this trouble, the copper coating obtained upon steel by immersing the steel in copper sulphate solution is actually a precipitate of cement copper. The copper is precipitated on the work chemically in a finely divided state. It has no strength nor continuity. The adherence of the coppered wire on the market is due to the exceedingly light coating of copper on it. When heavy coatings are had, such as your correspondent is putting upon his work, it is natural that the copper would peel upon the least bending. It will not peel in sheets, the same as an electroplated coating, but as a powder. The time of coppering steel articles in a sulphate of copper solution is generally less than a minute. Your correspondent uses 15 minutes. We suggest that the use of a very light coating of copper or electroplating the wire in a solution made of cyanide copper and sodium cyanide, such as found in any good text book on electroplating.

Answer No. 2

The Wire Association:

You requested information on copper coated steel wire on which the copper was deposited chemically. This is an entirely different product than we manufacture as the copper on Copperweld wire is put on by the Molten Process. Any information that I may give you in this letter is taken from my own experience and has no connection whatever with the Copperweld Steel Company.

The copper solution used by that company contains copper sulphate, tallow and acid. It is my opinion that the presence of this tallow forms a coating on the wire which prevents a good bond between the steel and the copper.

As a suggestion, I should advise this concern to try out the following solution:—24 lb. of sulphuric acid, 6 qt. of rye meal liquor, and 70 gal. of water.

The copper sulphate should be dissolved in the water first and if the solution is heated with steam and stirred it will dissolve very much faster. The sulphuric acid should then be added and finally the rye meal liquor.

To make the rye meal liquor, 250 lb. of rye meal should be added to 700 gal. of water and to this solution approximately 50 gal. of old liquor should be added to aid in the fermentation of the new liquor. Liquor made in this way should be allowed to stand 48 hours before using, but a new solution should be kept for a somewhat longer time as the fermentation takes place much slower without the presence of the old liquor.

The solution should be maintained at an acidity from 3-5. Copper sulphate should be added occasionally to maintain the strength of the solution. The amount to be added may be judged from the color and coating of the wire.

Answer No. 3

The Wire Association:

It is our opinion that most of the difficulty which the Canadian Mill is experiencing is caused by the fact that the wire is being left too long in the copper sulphate solution. It is our opinion that too long a dip in the coating tub allows too much iron to be dissolved and a film of carbide to form between the copper coating and the steel, which results in a loose deposit.

We would appreciate very much knowing as to whether or not a short dip, on the order of 20-40 sec. in the copper sulphate solution or only until the color of the wire loses its yellow glossy appearance and becomes a velvety red copper color, does not eliminate the difficulty.

Answer No. 4

The Wire Association:

As to the trouble with copper coated wire, there are many kinks to this branch of wire drawing which they will have to iron out as practice in one part of the country would not work out in another section.

They are using too much coating. Cut down on the time of the second coat as the wire already has some coating on it from the first immersion and will require very little on the second immersion. Experimenting along this line, they will soon find the correct time for the second coat, but certainly not 15 min., probably less than 5 min. will be sufficient.

The Wire Association is for the specific purpose of improving production methods. It was organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.

The following inquiries were received from and answered by members of the Wire Association. These inquiries are sent to the Secretary of the Association who acts as a central clearing point, and neither the names of the firms or individuals sending in the inquiry, or of the men or firms replying are divulged without permission.

Join the Wire Association!

Question No. 2a--Tight Coating of Wire ▼ ▼ ▼ ▼ ▼ ▼ ▼

The Wire Association:

What is the method of drawing coppered steel wire so as to make the copper and steel blend and stick perfectly?

We draw the No. 5 rod to 11½ gage as follows: First hole to 7½ after cleaning and dipping for about 2 minutes in a vat containing a mixture of water, balm (or old ale or yeast) copper sulphate and soft soap this gives a good but light colored coat. Next hole we re-dip until it is evenly coppered in the same vat and put it on a swift in a tub of water and balm so that it is covered and wet all the time it is running off, this gives it a better coat when drawn; a good copper color and it is now 9 gage. Next we put it straight back on the swift and draw it to 10¼. The coat is not so good this time but we now come to the last hole 11½ and this time we dip it in a finishing vat of water-balm and strong copper sulphate and some oil of vitriol, and we put it in for about 2 min. according to how it takes the copper. Then it is run off and is a nice copper color, but not fast, that is, if we give it a sharp bend and a touch or slight brush or bend the copper come off and of course this also occurs

when it is worked, a dust forming under the working machine.

Practically all of the information given in answer to Question No. 2 applies to this question as well.

Question No. 3--Clean Bars for Cold Drawing ▼ ▼ ▼ ▼

The Wire Association:

How can we produce a clean bar for cold drawing?

Our present method is to clean SAE 1112, 1120 and 1020 and some alloy bars ½ to 3 in. dia. x 36 ft. long, but submerging them in an agitating tub containing 5% sulphuric acid with an inhibitor of which we have tried various kinds, by volume for 20 min. with a temperature of 165 deg. Fahr. Then quickly transferring them to a fresh cold water rinsing tank and from there to a lime tank which has a temperature of 190 to 212 deg. Fahr. This liming of the bar is standard practice for cold drawing.

Our difficulty is in trying to produce a bright bar or light steel gray color, whereas all of our stock has a rather dark brown appearance.

Answer No. 1

We cannot help you in the matter of pickling a bar clean for cold drawing because this is a problem with which we have worked for a considerable period of time without being able to find the answer, and are still working on same.

The procedure you mention is fairly standard and it is my opinion that the subject member is employing good practice.

Answer No. 2

The Wire Association:

Your difficulty lies in the deposition of a very thin film of copper on the work. This will happen if the chain is bronze containing a high percentage of copper or if there is any copper present in the tank if you are using a tar inhibitor, the copper, the sulphuric acid and the tar inhibitor will bring about a deposition of copper from chain to the steel.

I suggest that you try Sum-foam Compound as an inhibitor instead of one of the tar type. This compound is made and sold by the William M. Parkin Co., Pittsburgh, Pa. It has been on the market some time and consequently is not an experiment.

Answer No. 3

Some inhibitors cause a greenish cast on the wire. Many people who draw bars have this same trouble. The best way I can tell about this is by telling what I would do if I had to do the job. It is well known in the wire trade that bright finished wire is not made by using hot lime; lime should be cold, 165 deg. Fahr. is too low a temperature for sulphuric acid unless time is no factor. What I would do is, use 5% of sulphuric acid at 180-190 deg. Fahr., let the bars stay in the acid until well cleaned, then wash them off thoroughly with cold water, then dip in cold lime and dry as fast as possible and draw in very soft grease or oil. Lime should not be heavy. Bars should not be allowed to dry before putting in the time and should be gotten into the lime and dry house as soon as possible after being removed from the acid.

Question No. 4--Flux for Tinning German Silver Wire ▼ ▼

Please tell me where to find a good flux for tinning German silver wire.

I am dipping the wire in melted tin, and no matter what temperature I use the tin does not flow freely off the wire but seems to make lumps on it.

I am using a mixture of muriatic acid, oleic acid, and cottonseed oil, but this is not very satisfactory.

Answer No. 1

The Wire Association:

Try zinc chloride in a nearly saturated solution acidified with about 2% of hydrochloric acid.

Answer No. 2

The Wire Association:

Our judgment concerning tinning of German silver wire is that the wire should be properly cleaned by using a diluted flux of muriatic acid with 50-75% water. If the wire is in coils and they use a good wiper and sufficient tension so the wire looks as if it were standing still while it is passing through the tin, the wire should be bright and smooth.

Answer No. 3

The Wire Association:

German silver wire can be tinned. The enclosed is a small sample of such wire that is properly tinned. The flux used on this is a solution of zinc chloride made by neutralizing hydrochloric acid with zinc.

Answer No. 4

The Wire Association:

Regarding a good flux for tinning German silver wire, our experience in this line has not been very extensive. We do know, however, that an alloy which has a large percentage of nickel is difficult to tin. We haven't anything definite to offer outside of saying that we have used the method outlined by you with a certain degree of satisfaction.

Question No. 5--Glass Dies for Copper Wire ▼ ▼ ▼ ▼

The Wire Association:

We are thinking of going in for copper cables on non-insulated work, and I understand that there are patent glass dies used for this purpose. What can you tell us about this?

Answer No. 1

The Wire Association:

We would advise that we are not familiar with the use of patent glass dies.

Answer No. 2

The Wire Association:

We are unable to give you any information dealing with the manufacture of copper cable, neither have we had any experience in the use of the patent glass dies used for this purpose.

Answer No. 3

The Wire Association:

We are not familiar with any glass dies used in connection with the cabling operation.

Answer No. 4

The Wire Association:

In all our experience we have never heard of glass dies being used in any part of the wire business.

The conventinal diamond dies are used for wire drawing, and we have had some experience with porcelain eyes, or guides, in our stranding and cabling machinery. This is as close to glass dies as we have ever come in all our years of experience.

Answer No. 5

The Wire Association:

I have had no experience in wire drawing and know nothing about glass dies for this work.

Answer No. 6

The Wire Association:

I have had no experience nor knowledge of glass dies for this purpose.

Answer No. 7

The Wire Association:

We are unable to give you any information as we do not know where glass dies are used in fabrication of cable nor have we any detailed knowledge of it, nor can we advise you as to any printed matter on copper cabling.

Answer No. 8

The Wire Association:

I do not know of any case where patent glass dies have been tried and consequently cannot give you any information.

Answer No. 9

The Wire Association:

Not only do we not know of any patented glass dies for copper wire drawing, but it would be our off-hand opinion that the copper oxide would wear them down. In other words, copper oxide laps out glass very readily.

Answer No. 10

The Wire Association:

I have never heard of these patented glass dies. We occasionally use in wire dies leading wire from spool to stranding point, glazed bushings.

(Please turn to page 68)

'Round the World With the Wire Industry

Britain Exports More Than Half World's Electrical Wire

BRITISH manufacturers are now predominant in the electrical wire and cable export trade. They have long held this position, but this year for the first time the exports under this head exceed the combined figures for the other four principal exporters of electrical goods—the United States, France, Germany, and Switzerland. Of a total of £7,202,300 ($36,011,500) from the five countries in the first 9 months of this year the United Kingdom accounted for £3,708,969 ($18,544,845), or 51.5%. In 1929 the percentage was 47.4.

The predominance of 1.5% over all other countries is small, and any moderate trade upheaval might rob Britain of the position. Growth in this trade, however, has been slow and steady rather than of mushroom character. On the other hand, part of the increase this year may be due to the American depression, where the internal industrial situation has been responsible for a decrease of 4% in electrical export figures. Moreover, of the total electrical exports of the five countries in 1929 America represented the largest share with 35.5%, whereas of the total for the first three-fourths of this year (1930) she represents only 26.9%. Her recovery may cause a rearrangement of these percentages.

Progress of Australian Wire Industry

Australia's wire rope industry may be said to have started early in 1925, when The Australian Wire Rope Works was established at Newcastle, N. S. W., in close proximity to the great steel works of that city. In the ensuing 5 years the industry has developed into one of considerable importance and value. The consistently high standard of the products of this works has been the principal factor in the success which has followed its activities, and has resulted in the establishment of an enviable reputation for the quality of the materials and standards of manufacture. That the undertaking's products are able to withstand successfully the most exacting conditions of wear is evidenced by the fact that they enjoy the cordial support of wire rope users throughout the island continent. To date the works has produced some 25,000,000 ft. of various types of wire rope, with a total weight approximating 8,000 tons.

Recently the works dispatched to the Victorian State Coal Mine, Wonthaggi, five ropes each 5,000 ft. in length and of 2¾ in. circumference, Lang's lay, representing 100% Australian production from the crude ore to the finished product. Including these ropes the works has supplied to this important colliery 185,000 ft. of rope of like size and quality.

Indicative of the wire rope activities proceeding in Australia, it may be mentioned that this works has recently completed orders as follows:—For New South Wales, 27,000 ft. of 2-in. cir. colliery haulage rope; 30,000 ft. of 2¾-in. cir. colliery haulage rope; 26,400 ft. 3-in. cir. colliery haulage rope, 2,216 ft. 7-in. cir. guying and straining rope for cableway towers, with a guaranteed breaking strain of 181 tons; 3,200 ft. 4-in. circumference winding rope for mine shaft; 5,400 ft. 3⅞-in. cir. winding rope for mine shaft; for South Australia, 5,000 ft. 3½-in. cir. galvanized ferry rope; 5,600 ft. 3-in. cir. incline haulage rope; 1,320 ft. 5-in. cir. special construction for use with heavy excavators; for Western Australia, 7,500 ft. 2¾-in. cir. colliery haulage rope; 5,200 ft. 4¼-in. cir. heavy mining rope; and for Tasmania, 2,000 ft. 4½-in. cir. heavy mining rope.

Among other outstanding contracts recently undertaken by the works are the 6¾-in. cir. 7x19 ropes for the River Yarra Suspension bridge, Kew, these ropes having a guaranteed breaking strain of not less than 170 tons; also the 7-in. cir. 6x19 guying and straining ropes supplied to the Sydney Metropolitan Water, Sewerage & Drainage Board for the cableway towers at Woronora Dam, these having an actual breaking strain of 181 tons. Many large specifications for haulage and winding ropes have been dealt with during the past year, and with this class or rope the most minute care is exercised in the selection and testing of the materials used. Winding ropes lower and raise the mine cage conveying the miners to and from their work, and where human life is at stake the undertaking adheres to a very wide factor of safety.

The undertaking devoted the whole of its energies towards the perfection of manufacturing methods and the distribution of its products has been delegated to two allied metallurgical firms—Bullivants' Australian Co., Ltd., and J. R. Reid & Sons, both of Sydney. Experts of these firms advise wire rope users as to the most suitable rope for their particular requirements, and by this means the works are kept entirely aloof from the commercial side of the industry.

French Wire Drawers to Cooperate

The French wire-drawers have at least decided on some measure of cooperation. They have decided to come together to form an entente which will regulate quotas of production for the majority of their wire products, but will leave prices entirely uncontrolled. Thus, while there will still be open competition, the dangers of overproduction will be greatly reduced. At the present time the French wire industry is receiving large orders for the fortifications now in course of construction on the eastern frontiers of France.

German Wire Exports Increasing

German exports of iron and steel products increased in November by 19,216 metric tons over the October figure. Imports, on the other hand, decreased by 5,827 tons—continuing for the fourth month the steady decline which be-

gan in August, and setting a new low record (since January, 1928).

The production in which the wire industry is interested includes ingots, blooms and billets which increased about 5000 tons, plain wire which increased 3000 tons, nails, tacks, rivets and washers which increased 30 tons and other wire manufactures which increased slightly. These other products decreased, iron and steel bars and rods, 3000 tons less, barbed wire, 2 tons less, wire rod 28 tons less, while wire cloth remained the same.

German Wire Cartel Adds Members

The German wire makers cartel has absorbed four small wire makers which will be directly adminstered, so that outsiders do not control more than 0.8% of the German wire production. In the beginning of the year the German wire industry was operating at 75% and end of the year at 50% of the total capacity.

Cadmium—copper wire is in good demand in Germany and as a consequence the production is rising. At present seven companies are producing this material and the use has been standardized by the DIN (German Bureau of Standards). The enamelled wire industry has satisfactory orders in hand and is also exporting. Recently an order worth $4,180 has been booked from a company in Galveston Texas.

The demand for wire rods is getting much better and as a consequence prices are firmer. It is probable that the allotment of the continental wire rod cartel for the first quarter of 1931, 390,000 tons, will be exceeded. It is difficult to boy below 5.10 f.o.b. and an order for Vancouver, B. C., was accepted at 31.-c.i.f. Prices for the Far East are also up.

Japan is at present a very good customer for wire shorts (regular scrap of wire production). The short ends, also bought by India are transformed into nails by small shops. In 1930 over 500 tons of such shorts were shipped to Japan and India from Germany at a fair price, as in Germany only the scrap price can be got for this material (4.0 per ton was the average price).

COMING EVENTS

Feb. 10-24, 1931—American Society of Mechanical Engineers, 4th National Fuels meeting, Chicago, Ill. Also 5th Midwestern Power and Engineering Exposition. Calvin E. Rice, Sec'y., 39 W. 39th St., New York, N. Y.

Feb. 16-20, 1931—Western Metal Congress. Second National Western Metal Congress and Exposition, Civic Auditorium, San Francisco, American Society for Steel Treating. W. H. Eisenman, 7016 Euclid Ave., Cleveland, sec'y.

Feb. 16-20—American Society for Steel Treating. Semiannual meeting in conjunction with National Western Metal Congress at St. Francis Hotel, San Francisco, Calif. W. H. Eisenman, 7016 Euclid Avenue, Cleveland, Sec'y.

May 18-23, 1931—National Electric Light Association Annual Convention, the Homestead, Hot Springs, Va.

June 15-19—Wire Assn. Show and Convention, simultaneously with Iron & Steel Exposition, Public Auditorium, Cleveland, O. Richard E. Brown, Sec'y. Wire Assn., 551 Fifth Ave., New York.

Whereas the demand for mosquito mesh (wire gauze) is at present very dull, more mesh for mines are demanded. Recently German and Dutch companies got orders from the Chilean Copper Mines (under American control). Phosphor-bronze mesh is preferred of a wire thickness of 33½—34 SWG. The price for this material had been substantially reduced owing to the keen existing competition.

German Wire Prices Advanced

The Continental wire rod cartel has advanced its quotations for export of Japan to £6.12.6 c.i.f. Yokohama and for export to Mobile/Houston/San Francisco to $ 31.— for Vancouver $31.50. The demand for wire rods is much better than a month ago. Wire prices are up also. Barbed wire American patterns 12 G £ 9.12.6, Continental (Yowa) patterns 2/6 less, wire nails basis £ 5.15.0, galvanized wire £7.—7.26, annealed wire £6.0.

Germany's copper, brass and other non-ferrous metals wire export in the year 1930 exceeded 21,000 tons, an advance of 10% compared with last year, whereas all the other European countries exported less tonnage of copper, brass and other non-ferrous wires.

American buyers contracted for shipment Jan./March 15,000 rolls of wire netting valued at approximately $ 45,000.

In the last week of January the Continental wire producers will meet again at Bruxelles to discuss the establishment of a continental wire cartel. It is firmly believed that before this data the Belgian wire cartel will be established and that it will be possible to come to some form of an agreement.

Foreign Trade Opportunities reported by the Bureau of Foreign and Domestic Commerce during the month of January include inquiries for wire and wire products from the following sources: Barbed wire (49156) Rio de Janeiro, Brazil; barbed wire (49254) Pernambuco, Brazil; ball and roller bearing machinery (49167) Berlin, Germany; wire winding machine for use in manufacturing brooms (49177) Mexico City, Mexico; asbestos yarns, tapes, ropes, etc., (49165) Toronto, Ontario, Canada; bronze and copper bars (49262) Santiago, Chile; tinsel for Christmas tree decorations (49184) Winnipeg, Canada; electrical wiring supplies (49290) Rio de Janeiro, Brazil; galvanized wire (49297) Bogota, Columbia; galvanized steel barbed wire (49339) Porto Alegre, Brazil; cotton carding, spinning, and twisting machines, and cotton looms (49302) Milan, Italy; card clothing (49308) Bombay, India; wire type, black wire, and flexible wire coated with cotton thread and white rubber (49391) Oporto, Portugal; steel bands and wire for making steel wool (49427) Glarus, Switzerland; plain and barbed wire (49436) Porto Alegre, Brazil; steel-wool-making machines (49427) Glarus, Switzerland; wire cloth screen (49539) Johannesburg, South Africa; barbed wire (49507) Rio de Janeiro, Brazil; ball bearing machinery (49511) Belgrade, Yugoslavia; ball and roller bearing machinery (49495) Berlin, Germany; rope-making machinery using cocoanut and banana fiber (49554) Bangkok, Siam; rough and smooth brass (49609) Fortaleza, Brazil.

THESE MACHINES FI

Sleeper & Hartley TRADE MARK

Whether your business is now expanding or is in a per of re
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CLUSTER ROLL COILING MACHINES
EDGEWISE COILING MACHINES
WIRE SPIRALLING MACHINES

WIRE STRAIGHTENING MACHINES

MULTI-HEAD WIRE STRAIGHTENING & CUTTING MACHINES
MUSIC WIRE STRAIGHTENING AND BUNDLING MACHINES

American Agents

NEW YORK TERRITORY—Triplex Machine Tool Co.
PHILADELPHIA TERRITORY—Swind Machinery Co.
CHICAGO TERRITORY—Neff, Kohlbusch & Bissell, Inc.
SAN FRANCISCO—L. G. Henes Machine Tool Division of Jenison Machinery Co.
LOS ANGELES—L. G. Henes Machinery Co.

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FILL EVERY WIRE NEED

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period of retrenchment, our machines, listed in part below, will
INCREASE QUALITY PRODUCTION PER LABOR DOLLAR

WIRE MILL EQUIPMENT

CONTINUOUS WIRE DRAWING MACHINES
PATENTING FURNACES AND TAKEUPS
SINGLE HOLE DRAWING MACHINES
WIRE POINTERS & WIRE PULLERS
TINNING & GALVANIZING FRAMES
PICKLING HOUSE EQUIPMENT
TAR-LINED TUBS, REELS, ETC.
ROLLING & FORMING MILLS

MACHINES FOR ELECTRICAL PLANTS

ARMORING MACHINES FOR WIRE, CABLE, ROPE, HOSE, BX, OR HOLLOW CONDUIT
TUNGSTEN FILAMENT COILING MACHINES
RESISTANCE ELEMENT COILING MACHINES
FLEXIBLE CONDUIT & CASING COILING MACHINES
FLEXIBLE TUBE COILING MACHINES
WIRE ENAMELING MACHINES
SPECIAL DESIGN MACHINES

NAIL AND FASTENER MACHINES

UNIVERSAL WIRE NAIL MACHINES
NAIL DIE GRINDING MACHINES
SCREW WIRE SWAGERS FOR SHOE WIRE
DUPLEX STAPLE MACHINES

AUXILIARY EQUIPMENT

FIXED PIVOT REELS FOR WIRE OR FLAT STRIP
TILTING REELS FOR WIRE OR FLAT STRIP
POWER-DRIVEN REELS OF EVERY TYPE

} equipped with friction brakes and bundle adjusting arms.

& HARTLEY, INC.

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Foreign Agents

UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London, E. C. 4
MONTREAL AND TORONTO—Arthur Jackson Machine Tool Co.
AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty. Ltd., Melbourne
JAPAN—Andrews & George Co., Tokyo

No Rejects

Personalities and Gossip of the Wire Industry as Told by a Roving "Trouble Shooter" ▼▼▼▼▼▼▼

THE first of the year showed marked activity in most of the wire mills in the middle and western section of the country. It was the hope not only of the management but of the superintendents and foremen that this would continue. To date, as a general thing, there has been no real let-up from this optimistic beginning. It seemed like old times, all blocks going full tilt, the cleaning houses steaming and operating staffs visibly worried by their ability or lack of it to make deliveries on time. You know when you get rusty from not having done things for a long time, you become a little dubious about your ability to step up to you former high speed. But, those who fifteen months ago learned the tricks of getting things out on time have not entirely forgotten how they did it and so much to their own surprise everyone has been able to make good the promises of an over-anxious sales department.

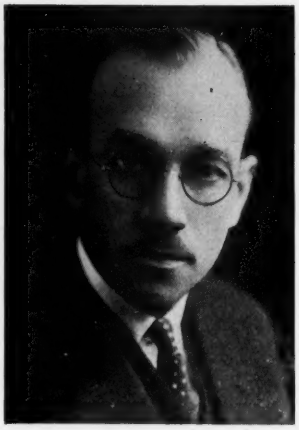
The Wire Association about which we heard last June, and for which those actively concerned with its success have tried to do so much, gets very little support from those prima donnas who feel that they have the "lion's share" of knowledge on any single or group of problems. It is my belief that there is very little in wire or wire drawing which is occult. What John Jones is doing, Jim Smith does equally well. The most successful mills from the standpoint of lowered cost in production, to my way of thinking, are those which do not admit of anything tricky in actual drawing. While it is true that some men do one thing very well one way, others seem to do it equally as well another, the difference only being in the method, the result in finished product being identical. Vanity as to discovery of any particular method, which, while it may be a sound method as far as final result is concerned, often blinds the proud possessor of the idea to the possibility of doing the job more sensibly and more cheaply. I know of many mills which use round about methods, more expensive methods to achieve ends which by directness would enable them to sell more cheaply. It strikes me that the more we view our industry as a straight out and out sensible production job, eliminating wherever possible the variables which have made wire drawing so nearly an art, bringing up our store of knowledge from actual proven performances reduced to data that can be appreciated and understood, the sooner all of us will produce a more uniform product more reasonably. Men in the industry who to me seem to outstand in the movement towards the stabilization of all factors which make a real production basis, which ultimately means lowered costs and more sales, are men of the type of Granger of Wickwire Spencer, Kinn of the Seneca Wire Company, Fostoria, Hill of Northwestern Barb Wire, Van Husen at Donora, King, Reese and Breining at Pittsburgh Steel, Hussey at Jones & Laughlin, Aliquippa, and Hitchcock at Atlantic Wire, Branford, Connecticut.

As wire drawing has been up until very recently primarily an art and an industry, it will only become one of our stabilized modern enterprises when the "hit and miss", the "guess and the chance" have been removed. When men of the type as those mentioned above and many others who for the moment I cannot recall have applied their genius to the removal of those fallible and very human weaknesses and excuses which constitute so much of the trouble in preparation of the final product, then and then only may we expect progress. I believe we can look forward to great things for the next four or five years in wire and I believe that a large part of the improvement in methods and lowered costs will come from a more open discussion of methods and processes. While it is true that some men can hide their light under a bushel, it is also true that when I light a light, that if it is a light of any brilliance at all, someone will be guided by it. Unless you have a patented process you cannot keep it hidden. The more you think it is hidden, the more you kid yourself. What wire needs is frankness of the various problems that confront each of the mills, and further and more than that, it needs in the individual mill the closer application of those principles of business which have made other industries successful. The first to apply the soundest business procedure will undoubtedly be the first to profit, and because of this longer able to maintain the lead.

This column is entitled "no rejects". In the past three years, by a concentrated and concerted effort on the part of those directly responsible with costs, rejects have been cut to the bone. But rejects are only the outward and visible sign of slip-shoddiness. The fact that they have been reduced by the efforts of the more progressive management means that those things which are visible and easily rectified have been successfully handled. But what of those problems in cleaning and rolling, which because they are still problems

(Please turn to page 74)

Outstanding Personalities of the Wire Industry



LAWRENCE H. BEVAN

LAWRENCE H. BEVAN was born in West Pittston, Penna., where he attended the public schools, later attending Wyoming Seminary and Pennsylvania State College, where he graduated in Metallurgical Engineering in 1912.

Joined the staff of Hazard Mfg. Co., Wilkes-Barre, Penna., in 1913 as Engineer of Tests, then Assistant General Manager, General Manager, and Vice President and General Manager. When the Hazard Wire Rope Co. was formed to operate the Wire Rope Division of Hazard Mfg. Co., he became Vice-President and General Manager and continued in the same capacity with Hazard. Resigned from the latter Jan. 1, 1928, when it was absorbed by another company.

Conducted considerable research in steel wire patenting, also iron, steel and copper wire drawing incident to the manufacture of iron and steel wire rope and copper insulated wires and cables, which products he promoted vigorously in the changing requirements of modern application.

May 1st, 1930, resigned as Vice-President and General Manager of Hazard Wire Rope Co. to join the staff of American Electrical Works, Phillipsdale, R. I., as Assistant General Manager.

WILLIAM H. SPOWERS, JR.

WILLIAM H. SPOWERS, JR., is a Consulting Engineer with offices in New York and has had the unique experience of 20 years devoted to galvanizing. His grandfather, John J. Spowers, president of the Jersey City Galvanizing Co. set him to work at an early age with that company. Both Mr. Spowers' father and his grandfather were outstanding figures in this industry for many years.

He is Associate Editor in charge of galvanizing of this publication and his work in the wire field has met with signal recognition.

Mr. Spowers has recently been engaged as consultant by the Keystone Steel & Wire Co. and Wickwire Brothers and numbers among his clients in the wire field some of the outstanding firms in this line.

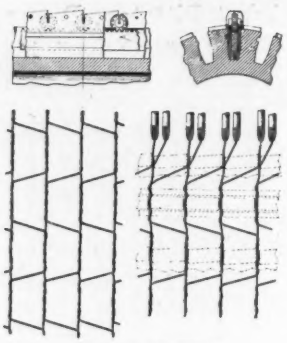
We understand that at Crestmont in his class Mr. Spowers is looked on as a contender for Bobby Jones' laurels.

H. E. Field has returned to Mackintosh-Hemphill Co. as vice president. In 1904 Mr. Field started with this company as manager of the foundry departments and occupied this position for 10 years, the last 2 years of which he acted in a consulting capacity for Seaman-Sleeth Co., now Pittsburgh Rolls Corp. He left Mackintosh-Hemphill to take the presidency of the Wheeling Mold & Foundry Co., which he occupied until it became part of the Continental Steel Roll & Foundry Co. Mr. Field was trained as a metallurgist at Worcester Polytechnic, and before coming to Pittsburgh filled the position as metallurgist for the Builders Iron Foundry in Providence, and the Farrel Foundry & Machine Co., Ansonia, Conn.

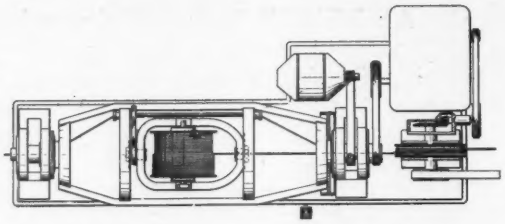
Raymond K. Albright, who has been actively associated with the Buffalo Bolt Co., Buffalo, since 1898, has been elected president, succeeding the late Ralph Plumb. Mr. Albright has been one of its executive managers since 1905, when he became vice-president. In 1921 he was made treasurer of the company and will continue to hold that office. **Ralph Hudson Plumb** has been elected a director. **J. J. McLaughlin** has been elected vice-president in charge of operations and **Proctor Carr** vice-president in charge of sales.

Carl W. Meyers has resigned as general superintendent of the plant of the Carnegie Steel Co., McDonald, O., to become superintendent of the Chicago bar mills of the Republic Steel Corp., effective Feb. 1. He assisted in building the McDonald works 13 years ago.

A Review of Recent Wire Patents

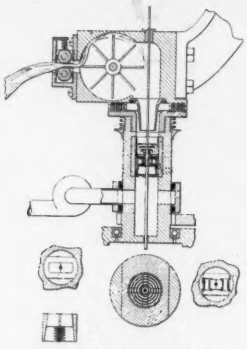


Sommer 1,783,946



Nigro 1,784,105

Sommer's Wire Fence Weaving Machine, 1,783,946, at Left. Center above, Nigro's Machine for Stranding Wire, 1,784,105. At Right, Trebes' Apparatus for Covering Wire Cores. ✦ ✦



Trebes 1,785,398

No. 1,783,620, WIRE CUTTING MECHANISM, Patented Dec. 2, 1930, by Allean William Johnson, Newark, N. J., Assignor to Westinghouse Lamp Co., a Corporation of Penna. The machine is provided primarily for cutting coiled filament wire into relatively short sections of uniform length. It is an object of the invention to provide mechanism operable in cooperation with the measuring drum of a wire-cutting machine to permit the same to actuate cutter mechanism in the absence of detrimental stresses upon the filament wire.

No. 1,783,946, WIRE-FENCE MACHINE, Patented Dec. 2, 1930, by William H. Sommer, Peoria, Ill. In the construction of a machine for the manufacture of light weight poultry nettings, particularly what is known as straight line poultry fence, the inventor has provided a new mounting for the rack-bars on the drum and new means for operating and reciprocating the rack-bars during the rotation of the drum. A further object of the invention is in the arrangement of the twisters of the alternate rows of twisters, whereby to allow, in part, the necessary wire in the warp or strand wires to provide for the twist thereof with the weft or woof wires.

No. 1,783,948, METHOD OF MAKING WIRE FABRICS. Patented Dec. 2, 1930, by William H. Sommer, Peoria, Ill. Particularly, this invention relates to wire fabric used in reinforced concrete construction. The invention has for its primary object, a method for making wire fabrics, wherein the welding or other connections between the cross and the marginal longitudinal wires, occur at points inwardly of the ends of the cross wires, so that the ends of the cross wires materially project beyond the marginal longitudinal wires, followed by severence of the projecting ends of the cross wires to cause the cross and longitudinal wires to lie flush with each other.

No. 1,784,105, WIRE-STRANDING MACHINE. Patented Dec. 9, 1930, by Michel Nigro, Worcester, and William H. Blount, West Brookfield, Mass. Assignors to Sleeper & Hartley, Inc., Worcester, Mass., a Corporation of Mass. This invention relates to a machine for twisting wires together to form a cable, etc. The object of the invention is to provide mechanism which will keep the wires apart and untwisted until they reach the twisting dies, so that straight wire will enter the dies.

No. 1,784,298, WIRE-STRIPPING MACHINE. Patented Dec. 9, 1930, by Charles B. Mahan and Carl M. Weber, Rochester, N. Y., assignors to Weber Machine Corp., a Corporation of N. Y. Among the objects of this machine which is provided for stripping the insulation from wire, is to make provision for stripping insulation from a previously gauged section of the wire and the point automatically located at which the stripping operation is to begin on the wire.

No. 1, 784,318, WIRE-TWISTING APPARATUS. Patented Dec. 9, 1930, by Albert Swanbaum, Duluth, Minn. This invention relates to fence-making machinery and particularly to the drive mechanism for the twister heads. It is an object of the invention to connect the pawl to a pinion gear which is in engagement with a slidable rack operated by a single connecting rod from the crank disc on the power shaft.

No. 1,784,453, CHAIN LINK WIRE FABRIC. Patented Dec. 9, 1930, by Arthur A. G. Land, Chicago, Ill. Particularly, this invention relates to interwoven wire fabrics of the so-called chain link type, the inventor aiming to provide a fabric in which different portions have different sizes of mesh openings.

No. 1,784,786, WOVEN WIRE AND METHOD OF ITS MANUFACTURE. Patented Dec. 9, 1930, by Moise H. Durand, Attleboro, Mass., assignor to Charles D. Blaikie, doing business as Smith, Richardson Co., of Attleboro, Mass. An object of the invention is to provide a woven wire particularly adapted for use on wrist watch straps. The method of manufacture includes forming a woven wire fabric of a width wider than that desired in the finished product, reducing the thickness of the side edges thereof substantially one-half, doubling over about one-half the width of said reduced edges onto the other halves, and compressing the doubled edges to substantially the thickness of the center body portion.

No. 1,784,859, TWISTING MACHINE. Patented Dec. 16, 1930, by William K. Weston, Sanderstead, England, assignor to Western Electric Co., Inc., of New York, N. Y., a Corporation of N. Y. The invention comprises a twisting machine for twisting wires into electric cables in which bobbins, each adapted to be rotated about an axis at right angles to and symmetrical with the longitudinal axis of the bobbin, are mounted so that their longitudinal axes lie parrallel to the axes about which all the bobbins revolve.

No. 1,785,398, APPARATUS FOR COVERING CORES. Patented Dec. 16, 1930, by Bruno Max Alfred Trebes, Berwyn, Ill., assignor to Western Electric Co. Inc., of New York, a Corporation of N. Y. Particularly, this invention relates to an apparatus for covering with insulation wire cores to form electrical conductors. Fibres may be applied directly to the cores without preliminary fabricating the fibres into another form such as spinning, etc.

No. 1,786,936, TAPERED WIRE ROPE AND METHOD OF MAKING THE SAME. Patented Dec. 30, 1930, by William E. Craig, Trenton, N. J., assignor to John A. Roebling's Sons Co., of Trenton, N. J., a Corporation of N. J. The method in this case comprises a rope core as a foundation to be used, and then successively decreasing the number of wire strands, substituting each dropped strand for the core through a substantial portion of the length of the rope.

No. 1.786,953, MACHINE FOR THE PRODUCTION OF MESH FABRIC AND CHAINS. Patented Dec. 30, 1930, by Karl Kindl, Grafenhausen, Near Neuenburg, Germany, assignor to Ernst Gideon Bek, Pforzheim, Germany. This invention concerns more particularly machines of the type in which open wire links or rings carried on a number of supports are taken off simultaneously from the lower ends of the same supports. inserted in the links previously formed and then closed.

Exports and Imports of Wire

Exports of iron and steel wire products in October and November, 1930
(In gross tons)

Items	October 1930	November 1930	November 1929	Year through November 1930	Year through November 1929
Wire rods	1,288	2,543	2,518	36,764	39,195
Hoops, bands and strips	2,609	2,125	4,634	37,491	65,657
Plain Wire	1,473	1,985	2,714	24,791	42,230
Barbed wire and woven wire fencing	3,566	2,473	3,476	37,251	60,081
Woven wire screen cloth	122	81	108	1,516	1,554
Wire rope	453	227	316	4,266	6,583
Insulated wire and cable	28	20	159	454	1,013
Other wire and manufactures	445	393	517	6,994	9,752
Wire nails	870	781	604	7,860	11,505
Nails other than wire	377	216	903	4,983	8,671
Tacks	27	24	42	403	1,619
Bolts, nuts, rivets, except track	659	533	1,058	9,441	14,756
Totals, these 12 classifications	11,917	11,401	17,049	172,214	252,616

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Wire rods	400	582	1,364	7,977	14,614
Concrete reinforcement and other bars	6,295	1,565	3,445	39,728	35,415
Barbed wire	263	279	519	4,164	5,455
Round iron and steel wire	225	216	320	4,013	5,349
Steel telegraph & telephone wire	6	3	7	63	26
Flat wire and strip steel	100	37	171	1,036	2,021
Wire rope and strand	122	195	169	2,281	2,229
Hoops and bands	51	1,587	2,513	20,374	40,582
Other wire	2,916	3	30	326	435
Nails, tacks and staples	418	711	591	5,217	8,594
Bolts, nuts, rivets and washers	33	7	47	309	355
Totals, these 11 classifications	10,829	5,185	9,176	85,488	115,075

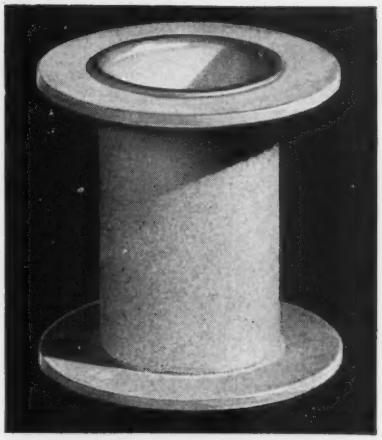
EXPORT trade in November dropped 19,882 tons below the October figures, with a total of 111,968 tons. Among the wire products, wire rods showed a very heavy gain exceeding 900 tons. As a matter of fact this was greater than November 1929 by more than 30 tons.

In numbers, if not tonnage, most of the wire products showed a decrease. For instance, plain wire showed a drop of 240 tons, barbed wire and woven wire fencing a drop of nearly 500 tons. Exports of iron and steel wood screws declined to 264,355 gross valued at $28,015. On the other hand brass wood screw exports increased to 26,506 gross valued at $7,504.

Imports gained 4,751 tons over the October figures. Concrete reinforcing bars showed a big increase as did nails, tacks and staples. The other items, in smaller tonnages, showed decreases.

Receipts of card clothing totaled only 8,451 sq. ft. valued at $11,366, the entire amount coming from the United Kingdom. Wire cloth and screening receipts likewise decreased—to 22,558 sq. ft., Canada supplying over half of this amount. Receipts of Fourdrinier and other paper-making wire fell to 6,832 sq. ft. Sweden and Germany being the main sources. Imports of wire fencing and netting more than doubled the October figure, to total 7,021,400 sq. ft. Germany, the Netherlands and, to a lesser degree, Belgium were the sources. Receipts of wire heddles dropped slightly to 1,214,000 pieces, the entire amount coming from France. Wood screw receipts made a considerable increase—to 7,884 gross valued at $1,134, Sweden supplied most of this, with some from Germany.

A survey of the October export figures indicate that Argentine, Mexico, Cuba and Venezuela are among our leading customers. The Argentine took the greatest quantity of galvanized wire and was the leader in barbed wire and second in insulated wire and cable. Mexico took the lead in woven wire fencing, second in wire screen cloth and horseshoe nails, and third largest quantity of barbed wire and horseshoes.



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Not an experiment

We are now prepared to offer the reel which the Magnet Wire Division of the Wire Association has been seeking for years. It is not an experiment, for this type of reel has been manufactured in England for years, and is used almost exclusively there by 90% of all wire manufacturers. This reel is being manufactured under a special license protected by patent, and we are the exclusive licensee for both the United States and Canada.

Write for information

Write us for full specifications of this reel. We will be glad to furnish you with complete information regarding sizes now available, and will furnish samples to demonstrate our principle of construction. In asking for quotation, please submit sample, if possible, or let us have the following information: Quantity desired, overall dimension of the flanges, inside measurement between flanges, outside diameter of drum, diameter of bore, and gauge of wire to be wound on the drum.

Cut your costs with this reel!

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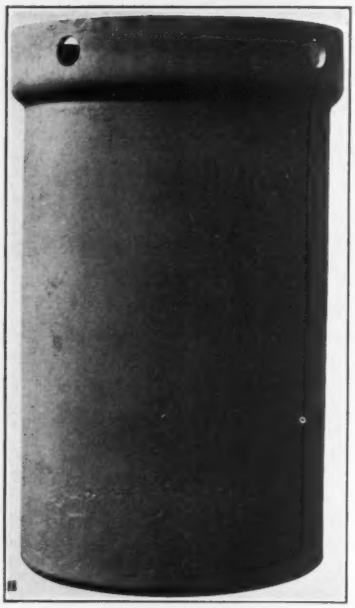
STANDARD FORGE
FIRE-HAMMER
WELDED
ANNEALING POTS



THESE POTS
can be furnished any practical size or shape. With either single or double bell offset at top and with or without lifting holes as shown.

Salt Annealing Pot
(Forge Fire Hammer Welded)
The shell or body of the pot can be furnished either straight or tapered.
We are specialists in
Annealing Pots
Lead Melting Pots
Salt Annealing Pots
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Columbiana Boiler Company
COLUMBIANA, OHIO

New Wire Machinery

Description of Recently Developed New Tools of Interest to the Wire Industry

"Electrical Eye" Automatically Determines Steel Temperature

An accurate automatic process is to be substituted for human eyesight and judgment in determining temperatures of steel in the various processes of manufacture. No previous mechanical device has been quick enough to give the essential instantaneous record of the temperature of metal, in the blast furnace or rolling mill. Tremendous losses thus occurred when the temperature was estimated too high, too low, or too inconsistently.

To illustrate this new use of the electric eye, J. V. Breisky, research engineer, Westinghouse Elec. & Mfg. Co., demonstrated its precision in measuring temperatures. On the lecturer's table was a photo-electric cell unit, a cozy glow heater, and a meter calibrated in degrees temperature. A varying current was made to pass through the heater, the temperature in the heating element thus being made to rise and fall. The slightest change—hardly noticeable to the human eye—caused an instantaneous variation in the reading of the meter. In the processes of steel manufacture, where accurate control of temperature is essential, and where human eyesight finds it difficult to judge the electric eye readily indicates temperatures from 1300 degree Fahrenheit up to the highest degree of heat encountered.

Another application of the electric eye, destined to effect almost every workman, office employe, or school child, was demonstrated next. A clever piece of apparatus automatically controls the lighting of factory, office or school. When the day is gloomy, when a storm arises, or when for any reason daylight varies, artificial lights will be provided; and they will be turned off again when daylight gives sufficient illumination. An unvarying degree of minimum light will thus be provided without human interference wherever this new device is installed.

This automatic light control device can be applied to many lighting problems. The illumination of electric signs or of display windows in shops may be similarly controlled, an additional possible feature being the use of time clocks to darken the windows during the night hours when no illumination is desired. Another interesting installation now in use, is that of controlling the flood lighting of several large gas holders located in the vicinity of an airport to insure the flood lights being on at any time during the day when daylight becomes too low. This prevents accidents to fliers and is used at the same time for orientation of aviators by means of markers on the gas holders. Similarly, street lights may be automatically controlled so that adequate illumination is provided at all times without the possibility of the situation being overlooked

J. V. Breisky, Westinghouse research engineer, demonstrating the use of the photo-electric cell, or "electric eye" in temperature control. As the current is varied in the cozy-glow electric heater (right), the change in the light intensity of the glow causes the photo cell (left) to record the change on a meter (center) graduated in degrees temperature.

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Bellet Diamond Die Works

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Factories: Trevoux, France and N. Y. C.

AMERICAN
PRESSED STEEL
REELS

PRACTICALLY INDESTRUCTIBLE
STANDARD TYPES 2½ IN. TO 8 FT.
SPECIAL TYPES MADE TO ORDER
WRITE FOR CATALOG

THE AMERICAN PULLEY CO.
PRESSED STEEL
PULLEYS HANGERS HAND TRUCKS
MISCELLANEOUS STAMPINGS
4200 Wissahickon Ave., Phila., Pa.

by a busy or neglectful official. It may be used, too, for automatic counting as a beam of light is crossed. The shadow of a passing body causes the electric eye to communicate with a counting machine. An automatic sorting machine was able to detect differences in the appearance of packages. A related device operated a fire extinguisher as soon as smoke appeared.

One of the large factory aisles of the Westinghouse plant in East Pittsburgh, in which a photo-electric cell automatically controls the use of artificial illumination.

Obituary Notices

Edmund Roebling, last of the four sons of the late John A. Roebling, died Sunday in his apartment at 156 West Eighty-fourth St., N. Y., where for 20 years he had lived in seclusion due to invalidism.

—

Ralph H. Plumb, 54, president, Buffalo Bolt Co., died at his home at 267 Linwood Ave., Buffalo, recently. Mr. Plumb had been ill for nearly a year prior to his death.

—

Fred W. Coons, president, F. W. Coons Wire Works, Troy, N. Y., died Dec., 1930. He was a prominent member Nat. Asso. Ornamental Iron, Bronze & Wire Mfrs.

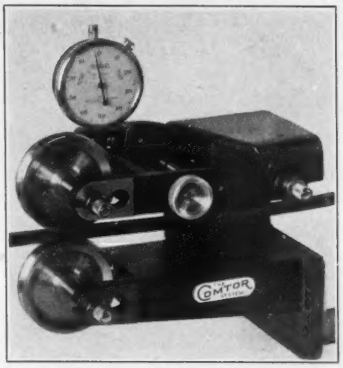
—

Harry Albert Hammond, for many years New York representative of the General Cable Corp., died at his home in New York Jan. 1, aged 59. He had been connected with the Rome Wire Co.

—

Frank H. Hamblin, 77, prominent in the wire goods business and for half a century treasurer, Hamblin & Russell Mfg. Co., Worcester, Mass., died at his home there Jan. 29 following a brief illness of pneumonia.

COMTORAGE W



In the production of insulated wire and cable uniform and correct diameter eliminates failures in electrical tests, and rejections from either undersize or oversize. It insures highest quality and lowest cost of product.

Comtorage W provides a reliable continuous indication of the exact diameter of insulated wire and cable as it leaves the tubing machine. It is sturdy, reliable, self contained.

THE COMTOR COMPANY
Waltham, Mass.

Ever Notice a Little White Streak in a Strand of Wire?

That's where the wire mill brazed two lengths of rod or wire together with Silver Solder. And that joint stood the stress of being drawn, cold, through many successive reducing dies.

"HANDY" SILVER SOLDERS

should be used in your own production work for making joints that will encounter shock or stress in use. The low price of Silver and the very small quantity of Silver Solder required for each joint make this method inexpensive.

Its use also greatly speeds up production.

Send for Bulletin No. 3WW

HANDY & HARMAN
57 William St.
NEW YORK CITY

Cut Welding And Production Costs With

MICROMETER PRECISION — MICRO-WELD TRADE MARK

Two models of MICRO-WELD with capacities from No. 20 wire to 5/8-inch rods will take care of your butt-welding work BETTER—FASTER—AND AT LESS COST!

Greater efficiency—new design—new ideas in construction—more capacity for work—much lower price—these are the reasons why you should hurry to learn all about MICRO-WELD.

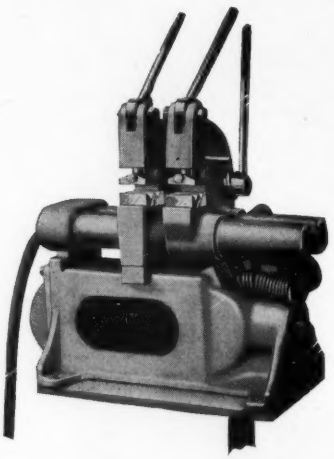
MODEL E (NOT SHOWN)
SELLS FOR $175.00.
(2½ kw. capacity — welds wires from No. 20 to No. 4 — perfectly.)

MODEL T (SHOWN HERE)
SELLS FOR $275.00.
(7 kw. capacity—welds stock of all shapes from ¼ to ⅝ in.—any metal.)
Slightly lower size limits on copper and aluminum.

We Also Make Spot Welders For All Requirements.
Write Us For The Complete MICRO-WELD Story.

WAIT!

We Will Shortly Announce a New Micro-Welder For Copper. Write Us For Early Details.



The MICRO PRODUCTS COMPANY
140 Industrial Street, Dept. 12,
Peoria, Ill., U. S. A.
European Office: H. A. Schlatter & Co.
Kusnacht-Zurich, Switzerland

Wire Questions and Answers

(*Continued from page 57*)

Answer No. 11

The Wire Association:

I am sorry to say that patent glass dies for stranding machines have never come to my attention, but I would be interested in knowing more about them in case any information comes to you from other channels.

Question No. 6--Wire Resistant to Abrasion ▼ ▼ ▼ ▼ ▼

The Wire Association:

Can you tell us what steel alloy would best serve to use in drawing steel wire possessing properties highly resistant to abrasive wear?

Please let us know the name of the alloy, the company who manufacture it, and send us an analysis of it.

We find both low carbon and high carbon wire do not answer the particular purpose we have in mind.

Answer No. 1

The Wire Association:

Try a 10-12% manganese steel made by Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Answer No. 2

The Wire Association:

We have been unable to get any information as to the best steel alloy for use in cold drawing steel wire, but believe this could be obtained from any reputable concern manufacturing tool steel.

Answer No. 3

The Wire Association:

The chances are that tungsten carbide dies will probably take care of this problem, and we would suggest that you tell your subscriber to communicate with the Arthur A. Craft Co., Chicago, Ill., to furnish dies of this character.

Answer No. 4

The Wire Association:

We find your letter somewhat ambiguous. Assuming that this manufacturer is looking for an alloy for drawing dies, we would recommend tungsten carbide. Such dies may be purchased from the

Carboloy Co., or from Union Wire Die Co.

If, however, the correspondent desires material for the wire itself, that should be resistant to abrasive wear, we do not feel in a position to advise him on this as we make no such wire for wire drawing purposes.

Answer No. 5

The Wire Association:

We recommend "Nichrome" and KA 2 alloys for certain applications where resistance to abrasion is important. We cannot make a recommendation without knowing a great deal more about the job, of course. If the customer feels that either one of these materials will be suitable for his application we shall be very glad to assist him in any way we can.

Answer No. 6

The Wire Association:

We are pleased to state that Vasco Crocar will fully meet the requirements specified.

It is a high carbon (2.10%), high chromium (12.50%) steel, and represents what is approximately the maximum obtainable as regards resistance to wear.

Answer No. 7

The Wire Association:

We make a steel alloy which would be just what the inquiry asks for. This would be a high manganese steel, of approximately the following composition: Manganese 23-25%, carbon .10-.15%, silicon .25% max. sulphur .020 max., phosphorous .020 max.

This would be highly resistant to any abrasive action, and can be cold drawn into wire. We do not have a trade name for this type of steel, but make it only on an analysis basis.

Battelle Memorial Institute, Columbus, Ohio, announces the establishment at the Institute of a research project sponsored by The Ironsides Co., Columbus, O., manufacturers of special lubricants. This will consist of a fundamental study of lubrication in respect to metal drawing and its proper application to modern practices.

Dr. Robert C. Williams, a specialist in colloidal chemistry with wide experience in this field, joined the Institute staff Jan. 1, and will be in charge of this research work under the direction of Dr. H. W. Russell, chief physicist.

The Southwark Foundry and Machine Co., has transferred its assets to Baldwin-Southwark Corp., as of December 31st, 1930. The latter corporation has assumed all outstanding liabilities and will carry on the entire business at their new Eddystone plant.

ADDOR
WIRE DIE WORKS

Our dies are guaranteed against breakage on soft wire.

Weights guaranteed as stamped on blanks and marked on invoices.

Our long experience with American wire mills puts us in a most favorable position to supply you with dies for your individual requirements. We can make immediate delivery from New York Stock.

ADDOR WIRE DIE WORKS

104 FIFTH AVENUE NEW YORK CITY

FACTORIES LES ABRETS FRANCE
TREVOUX

BALLOFFET

1870 — 1931

The Quality Diamond Dies

Our sixty years experience,

The quality of our stones,

Our special steel setting,

The output of our French Plants,

The large stock we are carrying,

Enable us to take care of the most particular requirements.

Balloffet Diamond Wire Dies Co., Inc.

13-15 East 22nd St., New York City

PLANTS AT

New York Lagnieu (France) Cluses (France)
Trevoux (France)

"Bell-Mine"

Rotary-Kiln
PULVERIZED

LIME

Free from grit and impurities
Exceptionally adhesive
Shipped in barrels, bags or bulk
Write for quotations

AMERICAN LIME & STONE COMPANY
Bell Mine Products
WARNER COMPANY—MANAGEMENT

AMERICAN LIME & STONE CO.
Main Office and Plant, Bellefonte, Pa.
Sales Offices: Bellefonte, New York City, Philadelphia, Pittsburgh

HUDSON WIRE CO.

Successors Royle & Akin
Fine Wire Manufacturers
OSSINING Established 1902 NEW YORK

Manufacturers of Fine Bare Wires

Copper Wire Specially Processed for Enameling Purposes

Copper	Lead
High Brass	Zinc
Low Brass	Commercial Bronze
Pure Tin	Phosphor Bronze
Cadmium	Silver Plated Copper
Bronze, Various Grades	False Gold

10%, 18%, 30% Nickel Silver

LAHN

False Gold Copper Silver Plated Copper

BRUSH WIRES **CRIMP and STRAIGHT**

Brass	Copper
Steel	Nickel Silver
	Phosphor Bronze

Metallic Fibre for Packing Purposes

Furnaces for Balls

(*Continued from page 54*)

arrives at the discharge end of the quenching drum. The water, in which the quenching drum is partially submerged, is circulated continuously and a series of spray nozzles agitate the water vigorously at the point where the balls enter the drum. A series of cast iron pockets are located at the discharge end of the cylinder, which raises the balls from the water and drops them into a container. At frequent intervals, representative samples are taken as they are discharged, and broken in a hydraulic press for careful examination of the fracture.

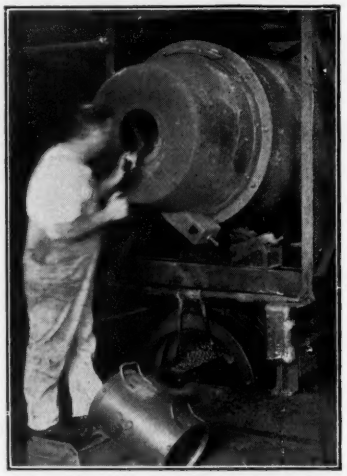


Fig. 3. Balls Are Automatically Discharged into Special Rotary Quenching Tank. ✦

What the Microscope Shows

A microscopic examination of correctly hardened balls, suitable for high-duty bearings, reveals a fine martensitic structure, free from excess cementite and undissolved ferrite.

The deep-quench method, of which no photograph is shown, requires a unit which comprises a series of metal plates, placed at approximately 30° angles and staggered in a vertical frame. This entire unit is immersed into quenching medium, which, as before stated, is usually water. The construction of the frame and the length of the plates is so arranged

that the steel balls, which travel down the inclines by gravity, reach water temperature by the time they arrive at the bottom of the unit. This method is favored by some ball manufacturers because of its simplicity and the absence of moving parts which are so apt to become troublesome.

Tempering Oil Baths

WHERE oil is employed as the tempering medium, it is customary to use rectangular tanks, using either gas or electricity for heating the oil. Care is taken to see that the entire bath is of a constant temperature, and the same rigid automatic temperature control is maintained as is found in the other heat treating operations. The steel balls are placed in containers, usually of the basket type, and then immersed in the oil. Either the oil or the balls should be agitated to insure penetration of the heated tempering oil to the center of the ball mass and to avoid uneven heating in different parts of the charge.

Steel balls used in high-duty ball bearings are subjected to many flexings per minute as they pass through the load area of a bearing in operation. The number of times this can be repeated without failure occurring, is dependent to a great extent upon the heat treatment of the steel used in these balls and the quality of the steel employed. We, therefore, return to the first statement, and repeat that probably no factor entering into the manufacture of high-duty bearing balls is of greater importance than the proper heat treatment of the steel, and, second only to this proper heat treatment, is the quality of the steel itself.

Charles G. Stevens Co., 560 West Monroe St., has been appointed sales representative for the Chicago territory for the Holyoke Co., Inc., manufacturers of gutta percha insulated wire, midget and other set assemblies, remote control cables, etc.

The Standard for High Carbon Wire

English Brand Wire Drawing Soap

Proven efficiency by years of continuous use.

THE J. T. ROBERTSON CO., INC.

SYRACUSE, N. Y.

Wire drawing soap specialists since 1893.

STEELSKIN

REG. U. S. PAT. OFFICE

For High or Low Carbon Wire

WIRE DRAWING SOAPS

Established 22 years.

R. H. MILLER Co., Inc. Homer, N. Y.

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WIRE DIE WORKS, INC.

129 FULTON STREET, NEW YORK CITY

STEEL SET

DIAMOND DIES

ALLOY DIES

ACCURATE SIZE

Smooth Draw Highest Quality

DEALING IN GOOD USED EQUIPMENT
WE SAVE YOU MONEY AND TIME

SOME ITEMS IN OUR STOCK

½" Shuster Straightener with 12' 0" Cut off.
¼" Shuster Straightener with 3' 0" Cut off.
No. 1 Sutton Round Bar Straightener.
No. 1 and No. 2 Waterbury Farrel Triple Die Horizontal Swaging Machines.
5-No. 1 Cone Waterbury Farrell 10 Die Fine Wire Machines With Spooling Attachments.
Draw Benches — Bull Blocks — Hot and Cold Rolling Mills.

Let Us Quote on Your Requirements
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THE MOST RELIABLE
DIAMOND DIES
ON THE MARKET TODAY
USE OUR DIES
FOR SAFE and SUSTAINED PRODUCTION

COCHAUD WIRE DIE CORP'N
Manufacturers of
WIRE DRAWING DIAMOND DIES

Factories: TREVOUX; Pont-De-Vaux-France
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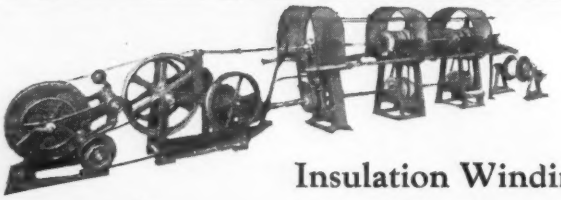
WIRE DRAWING
Machinery and Equipment

Rod Frames—16" Frames
8" Frames—Take-Up Frames
Wire Pointers—Puller Tongs
General Castings for Wire Mill Use
Circulars on Request.

E. J. SCUDDER FOUNDRY & MACHINE CO. TRENTON N. J.

WIRE BUNCHING MACHINES
WIRE STRANDING MACHINES
TWINNING MACHINES Up to And Including
SEVEN CONDUCTORS
(Manufactured under the Dawes Patents)

HASKELL-DAWES MACHINE CO., INC.
Ontario St. Below Trenton Ave.,
Philadelphia, Pa.



HIGH-SPEED BALL-BEARING
Insulation Winding Machine

for applying two tapes from concentric rolls and a cotton binder. Machine has automatic stops for broken tapes or exhausted rolls of tape. Can be built for any number of tapes.

EST 1855 AINCo INC. 1915
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.
517 Huntingdon St.,
PHILADELPHIA PENNSYLVANIA U.S.A.

9

Advantages of Galvanizing Furnaces

(*Continued from page 52*)

Galvanizing Principles

IN considering the advantages and disadvantages of different types of furnaces for hot galvanizing of wire the whole situation boils down to the difficulty of meeting the definite principles required in hot galvanizing. The most important principle which must not be violated is that the temperature must be maintained below 900 deg. F., as illustrated by the curve of pot destruction which has been shown a number of times elsewhere. It is so important that it will not be harmful to again show it here. The chart shows the progress of pot destruction with different temperatures. It is to be noted that above 900 deg. F. destruction is very rapid, the zinc attacking and dissolving the steel at a very rapid speed. Any furnace design that will set up conditions which violates this curve will therefore have a short pot life. The advantages and disadvantages therefore revolve about the ease of application of the pot design and furnace design to meet this set of conditions, and to also meet all the other conditions of plant management, technique, and details of practical operation. It is readily seen why so many pots fail quickly when the requirements are so strict. Particular difficulty is encountered with deep pots as the matter of heat supply and heat distribution becomes a very difficult problem to solve in relation to production required and the requirements of this curve of destruction. A 4-ft. depth has become for that reason practically a standard depth for most of the pots in this country. The deeper the pot, the harder to obtain even heat distribution.

Accurate Process Control

ANOTHER feature of extreme importance which was not realized until the research work had brought to light the exact conditions of pot destruction,

is the necessity of accurate temperature control. A wide temperature variation will inevitably violate the curve of destruction. In one plant uniform temperature is considered so important that special temperature charts are used with a red line at 840 deg. F. The temperature is carried at all times day and night as near as possible to this line. It is at this point where the advantages of electricity as a fuel are evident. The accurate control, together with the cleanliness of this type of heat are distinct advantages which to a large extent counterbalance the increased cost.

A summary therefore of the advantages and disadvantages of different types of furnaces may be stated as follows: —

1. Deep pots are a distinct disadvantage. Average depth is 48 in.

2. Very large pots and very small pots are usually hard to maintain economically. The average size is about 10 to 20 ft. long, 48 in. deep, and the width varies from 30 in. to 48 in. Pipe, structural work, wire, etc. require a larger size of necessity.

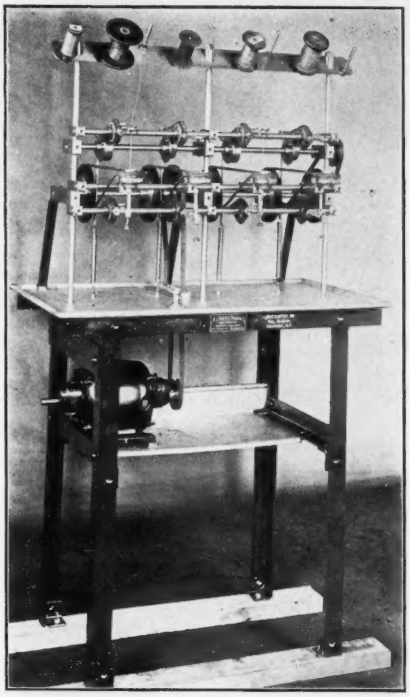
3. Very shallow pots, especially if heat is applied on the bottom, are very disadvantageous due to floating the dross, increasing dross production, and producing a hard brittle coating which peels and flakes easily.

4. Coal-fired furnaces are cheap to operate from the standpoint of fuel cost, but very poor economically in view of the results possible with better heat distribution and control. The disadvantages out-number the advantages with coal fuel.

5. Coke-fired furnaces are slow to pick up, and very hard to hold the heat on heavy production. This fuel is very rigid and subject to very wide temperature variation at times, especially at night, which is in direct violation of the principle that heat should be applied as low as possible. Heat distribution is also difficult with coke.

6. Gas is a very good fuel from the standpoint of flexibility, but overheating at night is liable to occur even more than with coke. The very large amount of fuel quickly available makes gas a

The Haddow Die Re-Cutting and Polishing Machine will lower your die re-cutting cost to a fraction of present costs



Recuts dies about ten times faster than by the needle and dust methods and with less diamond dust.

Any unskilled operator can learn to handle it quickly and efficiently.

ONE MONTH'S SHOP PRODUCTION

Total number of dies cut —1047

Total number of hours required—182.5

Average number of dies per hour—5.73

Number of operators—1

With only one man—This machine will do the work now requiring four to six men in less time and at lower cost.

4 HEAD MACHINE—Also Made in 6-Head size (With 2 Heads for Heavier Dies).

Fully Protected by Patents
For Information About Shop Rights

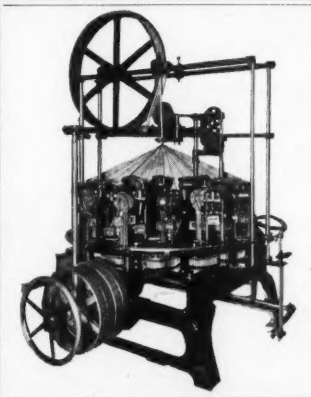
WILLIAM HADDOW
17 Eastern Ave.
Ossining, N. Y.

"PREMIER"
Trade Mark Reg. U. S. Pat. Off.

USERS REPORT:
—Less interrupted production
—Less repair work
—Less replacements

As wire drawers for over 30 years, your problems are ours. We have worked them out for ourselves and PREMIER dies made for your individual needs will work out your most difficult die job.

DRIVER-HARRIS COMPANY
HARRISON, NEW JERSEY
Chicago - Detroit - Morristown, N.J. - England - France
Cleveland *Alloy Makers since 1899* Italy



WIRE BRAIDERS

Multiple Head Wire Covering Braiders

Single, Double or Triple Deck Wire Covering Braiders

Single, Double or Triple Deck Cable Braiders

FIDELITY MACHINE COMPANY
Philadelphia, Pa.

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DIAMOND DIES

MADE IN FRANCE

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The Second Annual Meeting and Exhibition of

The Wire Association

WILL BE HELD

At the Auditorium, Cleveland, Ohio

JUNE 15th to 19th 1931, INCLUSIVE

SPLENDID TECHNICAL SESSIONS

EXHIBITS OF

WIRE DRAWING AND FORMING MACHINERY, INSULATED WIRE AND CABLE MACHINERY, DIES, REELS, LUBRICANTS, WIRE MILL EQUIPMENT, ETC.

COME and MEET the PRODUCTION MEN of the INDUSTRY AT A REAL "GET TOGETHER AND GET ACQUAINTED" MEETING !

good fuel from a production standpoint, but the same advantage is an extreme disadvantage if the furnace is not properly designed. The pot life may be very short. Explosions wrecking the furnace flues etc. are another factor which must be watched very closely.

7. Oil has a very high calorific value and therefore it is very difficult to burn this fuel and at the same time meet the low limits of temperature required for hot galvanizing. The most difficult feature of oil fuel is to burn it economically and efficiently, and at the same time keep the heat low so as not to form hot spots, or areas of high heat concentration. Fire hazard is also important.

8. Electric heat, in so far as heating is concerned is the ideal fuel for hot galvanizing. The control is very accurate and the distribution can be arranged and controlled as desired. The big disadvantage of electric heat is its costs of installation and equipment, and the cost of the fuel itself which is 2-3 times other fuels.

After all is said and done there are few advantages of one furnace over the other, or one fuel over the other. It is in the last analysis a question of human intelligence and supervision as right at the present moment there are plants getting good and bad results with the same fuel and the same kind of work. An investigation in one industry alone disclosed the surprising fact that common sense, good management, and a keen understanding of handling men are most important.

No Rejects

(*Continued from page 62*)

force the wire mill man to be watchful to keep his end up?

Wire needs a rejuvenation! It needs the backing of the management, giving the support to those conscientious superintendents who would do much if they felt that the cooperation from above was actively there. It seems almost wicked to overlook the possibilities in reduced costs which most of us do. But a condition of this sort has always been true just before the dawn of keener and re-awakened production consciousness.

WIRE DRAWING DIAMOND DIES
IN NICKEL STEEL SETTINGS

Manufacturers for Over 35 Years
[Originators of the Steel Setting]
F. KRAUSE & CO., Inc.
250-252-Ogden Ave.
JERSEY CITY, N. J.

VALUE

at the conveniently located
HOTEL ST. PAUL

$2.00 and up for one for a Room with Bath

This hotel is noted for its home-like atmosphere, courtesy and efficiency of management, and makes an ideal New York home.

An Up-To-Date Coffee Shoppe
At Popular Prices

One Block from Columbus Circle and Central Park.

HOTEL ST. PAUL
60TH ST. WEST OF B'WAY, N.Y.

The Waterbury Wire Die Co.

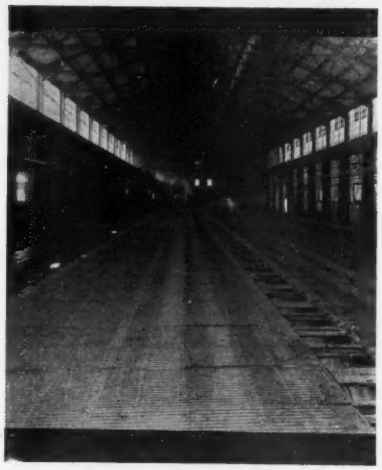
Diamond, Composition and CHILLED IRON DIES
Waterbury, Conn.

Furnaces for Steel Strip

(*Continued from page 49*)

seven tunnel-type gas burners located in two groups on the sides. One long manifold serves the two groups on one end of the furnace, those on the other end being served with one similar. To each burner is attached an inspirator or gas-air proportioner. The heat of the lead bath is controlled with two automatic controllers each with a thermocouple in the bath and a recording pyrometer which gives a chart of the temperatures.

This pan will hold 7½ tons of



Cooling Beds for a Steel Strip Mill. ✦ ✦

lead and a thin coating of coal screenings is used on top of the molten bath as insulation against heat radiation and slagging. Work up to 1 in. in width can be annealed in this pan but the total width of all the work running through at one time must not exceed 36 in. The speed of the reels is so regulated that the work travels through the bath at varying speeds from 8 to 50 ft. per min. There is another and similar setup in this plant which is used with an installation for japanning.

Strips Travel Vertically for Cooling

WHEN the strips emerge from the lead bath the line of travel changes abruptly from the horizontal to the vertical as they rise up over a series of rolls, 20 feet above the floor, and down again. During this travel they

Steel reels

last longer
Constructed of corrosion resisting materials, three to four times the life of a wooden reel is a reasonable expectancy. The cost of a "Red Head" Reel is less than twice the cost of a wooden reel.

reduce freight
Appreciably lighter than wooden reels, "Red Head" Reels cost less to Ship— a cumulative saving that more than offsets increased first cost.

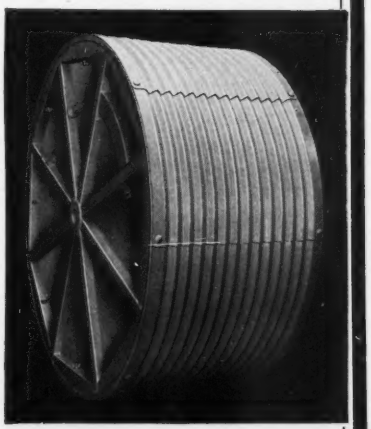
reduce investment
The longer life of "Red Head" Reels reduces the investment in reel equipment.

reduce repairs
Service records show that wooden reels require frequent repairs and rebuilding. With "Red Head" Reels such repairs have been radically reduced.

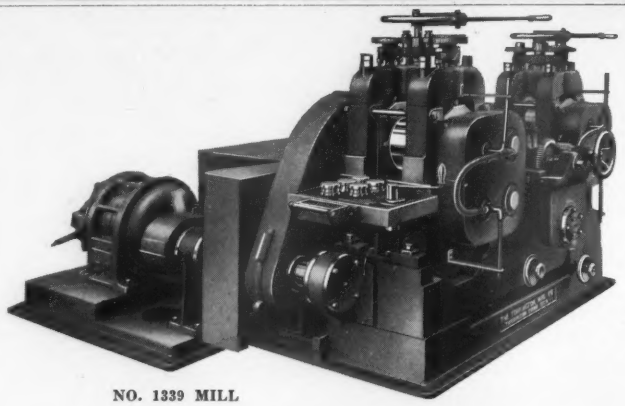
increase protection
Smooth inner surfaces: Much greater strength with the absence of all cutting or abrading projections—these protect not only the cable but the men handling it.

Copy of results of comparative tests will be furnished upon request.

"Red Head"



Manufactured and sold by
R. B. HAYWARD COMPANY
1714-1736 SheffieldAve.,Chicago and Graybar Bldg., New York
Under license arrangement with Electrical Research Products, Inc. Subsidiary of Western Electric Company, Incorporated.



NO. 1339 MILL

For the High Speed Production of Flat Wire With Round Edges or Round Corners

Equipped throughout with SKF Ball and Roller Bearings, making possible the attainment of greatly increased rolling speeds.

The Torrington Mfg. Co.
Torrington - Conn, U.S.A.
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NEW YORK'S NEWEST

NEW! MODERN! LUXURIOUS!

1000 Rooms—1000 Baths

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RADIO IN EVERY ROOM

$3 DAILY

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NEW HOTEL

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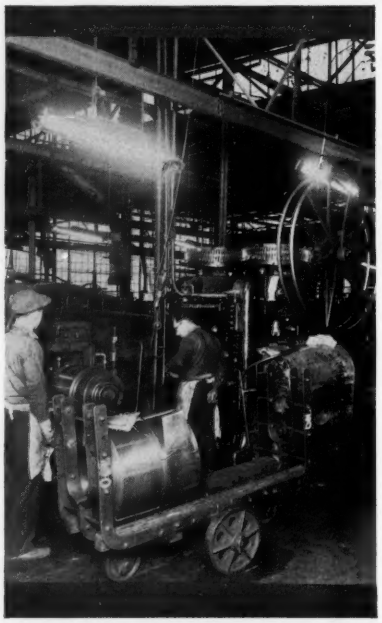
7th Avenue at 51st Street, New York

cool off sufficiently to enter the pickle vat, wash tank and galvanizing unit. All of these units are placed in one straight line and the strands pass through each in turn. The cooling rolls are adjustable so that they can be lifted to any height to give the proper cooling period regardless of time cycles in lead and galvanizing baths.

The galvanizing setup consists of wood tanks for holding the gal-



Scene in the Winding Department of a Strip Mill.

vanizing solution, and the work is electroplated as it passes over zinc bars in the tank. Electric current is furnished by four motor generator sets.

As the strands pass through and out of this bath they run over pulleys, descend through the floor to the room below where they change direction over a second set of pulleys and pass through a second galvanizing bath, similar to the one described.

Emerging from the last bath the strands are wound up on eighteen coiling reels corresponding to those from which they were unwound. This battery of reels is operated from a single motor-driven shaft with slip clutches.

Units in the Japanning Installation

IN the japanning installation the first unit in line is a gas-fired

BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

ANNEALING FURNACES
Charles F. Kenworthy, Inc., Waterbury, Conn.

ANNEALING POTS
Columbiana Boiler Co., Columbiana, O.
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington. Conn.
Watson Machine Co., Paterson, N. J.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

BRAIDER CARRIERS
Mossberg Pressed Steel Co., Attleboro, Mass.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CLEANING & PICKLING EQUIPMENT
Vaughn Machinery Co., Cuyahoga Falls, O.

CRANES—Wire Mill
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Chilled Iron
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Diamond
Addor Wire Die Works, N. Y.
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Bellet Diamond Die Works, N. Y.
Cochaud Wire Die Co., New York.
Driver-Harris Co., Harrison, N. J.
Globe Diamond Die Corp., New York.
Koebel Wagner Diamond Corp., New York, N. Y.
F. Krause & Co., Inc., Jersey City, N. J.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Urdika Wire Die Co., N. Y. C.
Vianney Wire Die Works, New York.
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Composition
Addor Wire Die Works, N. Y.
Bellet Diamond Die Works, N. Y.
Urdika Wire Die Works, Inc., New York

DIES—Repairs & Re-Cutting
Addor Wire Die Works, N. Y.
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Bellet Diamond Die Works, N. Y.
Cochaud Wire Die Corp., New York.
F. Krause & Co., Inc., Jersey City, N. J.
Urdika Wire Die Co., N. Y. C.
Vianney Wire Die Wks., N. Y.

DIES—Recutting and Repolishing Machine
Wm. Haddow, Ossining, N. Y.

DIES—Rod and Tube Drawing
Carboloy Co., Inc., Detroit, Mich.
Master Wire Die Corp., N. Y.
Union Wire Die Corp., N. Y.

DIES—Tungsten Carbide
Bellet Diamond Die Works, N. Y.
Carboloy Co., Inc., Detroit, Mich.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.

DRAW BENCHES—
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

DRIVES—V-Belt
American Pulley Co., Philadelphia, Pa.

FLUXES—Soldering
Kester Solder Co., Chicago, Ill.

FURNACE—Non-Oxidizing Annealing
Charles F. Kenworthy, Inc., Waterbury, Conn.

GALVANIZING ENGINEER
W. H. Spowers, Jr., New York, N. Y.

GALVANIZING—Hot
Wallace G. Imhoff Co., Vineland, N. J.

GALVANIZING LADLES, PANS, POTS
Columbiana Boiler Co., Columbiana, O.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
R. H. Miller & Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

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lead pot for annealing, similar to the one described. There are twenty reels and they set on the first floor, the strands rising through the ceiling and over pulleys to the lead bath which is located on the second floor. In the case bright annealing is desired and is obtained by cooling the strands in an atmosphere of gas. This atmosphere is confined in a bank of twenty pipes, one for each strand, about 80 ft. long, and 1½ and 2½ in. in diameter.

These pipes are located some 10 ft. above the floor and at the charging end are bent down until the ends are just submerged below the level of the molten lead. In this way the pipes are sealed off from the outside atmosphere and the escape of gas which is blown in under pressure is prevented at this end. The strands, after going through these pipes, drop down over a set of pulleys to another set which changes the direction of travel to the horizontal again, so that they will pass through an automatic japanning device and a baking oven, both

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Professional Directory

Listing in the Professional Directory is recommended to all engineers, engineering and construction firms and consultants seeking business with wire mills or plants utilizing wire in any form.

W. H. Spowers, Jr.
Consulting Engineer
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Specializing in Galvanizing Plants Designed and Installed
Practical Engineering Advice
Vanderbilt 7395

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HOT GALVANIZING
Plants Installed Consulting Service
VINELAND, NEW JERSEY

Broden Construction Co.
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PATENTS
TRADE-MARKS
SERVICE

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Evidence of Conception

Before disclosing your invention to anyone send for blank form "EVIDENCE OF CONCEPTION" to be signed and witnessed. As registered patent attorneys we represent hundreds of inventors all over the United States and Canada in the advancement of inventions. The form "Evidence of Conception," sample, instructions relating to obtaining of patents and schedule of fees sent upon request.

Lancaster, Allwine & Rommel
Registered Patent Attorneys
473 OURAY BUILDING
WASHINGTON, D. C.
Originators of forms, "Evidence of Conception."

placed directly under the pipes.

The japanning device consists of a tank of liquid japan with a series of metal rollers so set in the top that the lower half of each is submerged. The rotation of these rollers coats them with japan and as the strands ride over them they in turn receive a coating of japan. As this japan must be baked on the next unit in the line is a gas-fired baking oven which is constructed of brick with the gas burners set in the sides. This unit is 30 ft. long, 5 ft. wide and 6 ft. high, encased in steel plate. There is no hearth and eight tunnel type burners are used, which fire into tunnels running across the oven and the heat is distributed through vents in these tunnels. This oven is carried at 800 deg. F. and this temperature is maintained with the aid of three thermocouples and recording pyrometers.

Two Batteries of Coiling Reels

THE coiling reels are located on the floor below and the strands pass down through the ceiling to these reels. This battery of coilers is divided into two long rows, and is motor driven. Slip clutches maintain tension.

Serving the hot strip mill are three gas-fired slab furnaces. The steel slabs range in width from 3 to 19 in. and are 10 ft. long. Sometimes these are sheared hot to 5-ft. lengths as they emerge from the furnaces. These slab furnaces are of the end-charge and end-discharge type, the slabs being charged at the back and pushed through with a mechanical pusher. They ride through on water-cooled skids and drop off at the discharge end, after attaining a rolling temperature, onto an inclined slope which precipitates them onto the roll table.

Using gas as a fuel, the furnaces are fired from the discharge end, the air for combustion reaching the burner ports at 1,100 deg. F. having been preheated in a recuperator. The temperature of the gases is highest at the discharge end and they gradually give up their heat and lose temperature as they approach the downtake to recuperators at the charging end.

BUYERS' GUIDE, Continued

MACHINE—Die Re-cutting and Polishing
Wm. Haddow, Ossining, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt. Co., Providence, R. I.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
Haskell-Dawes Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Amer. Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Coiling
Broden Const. Co., Cleveland, O.
Haskell-Dawes Mach. Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Cutting
American Insulating Mach'y Co., Phila., Pa.
Hallden Machine Co., Thomaston, Conn.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Extruding
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing Wire
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Measuring Wire
New England Butt. Co., Providence, R. I.
Watson Machine Company, Paterson, N. J.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Morgan Construction Co., Worcester, Mass.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rivet
Waterbury-Farrell Fdry & Machine Co.,

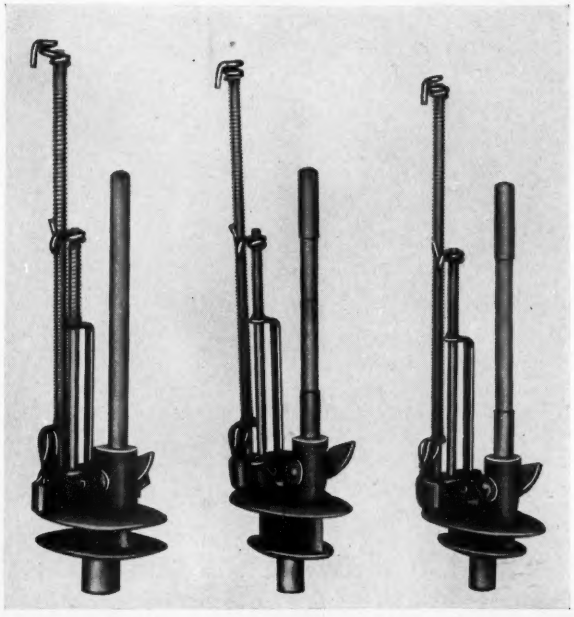
MACHINERY—Rod Drawing
Morgan Const. Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Strip Covering
American Ins. Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Improved Mosspeed Braider Carriers



THE patented Mosspeed spring tension take-up makes it possible to speed up the Maypole-type of braiding machine, in many cases the effective speed being increased up to 80%. These higher speeds may be maintained with less wear and tear on both carriers and machines than slower speeds with old-style drop-weight carriers.

Tell us what machines you use. We will be glad to show you how Mosspeed Carriers may be used to increase your profits.

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PRESSED STEEL CORP.
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Greenville, S. C. Dallas, Texas
Selson Engineering Co., Ltd., London, Eng.

BUYERS' GUIDE, Continued

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Hallden Machine Co., Thomaston, Conn.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stranding
American Insulating Mach'y Co., Phila Pa.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Swaging
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrell Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Used
Crawford, F. H., Co., N. Y.

MACHINERY—Welding
Micro Products Co., Peoria, Ill.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Manufacturing Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Watson Machine Company, Paterson, N. J.

MACHINERY—Wrapping Coils
Terkelsen Machine Co., Boston, Mass.

PACKING—Metallic Fibre
Hudson Wire Co., Ossining, N. Y.

POINTERS—Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

POTS
Columbiana Boiler Co., Columbiana, O.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PULLEYS AND SHEAVES
American Pulley Co., Philadelphia, Pa.

REELS AND SPOOLS—
American Pulley Co., Philadelphia, Pa.
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

REELS—Annealing
American Pulley Co., Philadelphia, Pa.

REEL AND TENSION STAND—
Sleeper & Hartley Inc., Worcester, Mass.

REEL CRUTCHES
Watson Machine Co., Paterson, N. J.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

SOLDER
Kester Solder Co., Chicago, Ill.

SOLDER—Silver
Handy & Harman, N. Y.

SPOOLS—Wire and Cable
American Pulley Co., Philadelphia, Pa.

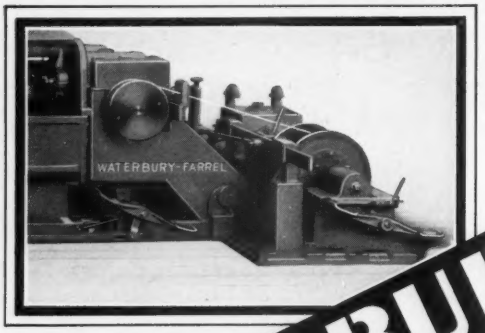
TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

WIRE—Various Kinds
Hudson Wire Co., Ossining, N. Y.

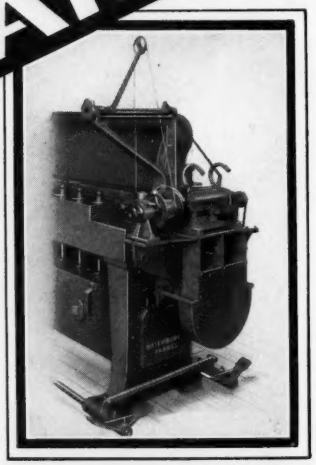
This is a carefully classified index of concerns who speci alize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

= WIRE SPOOLING MACHINERY =



For use with high-speed continuous wire drawing machines.

WATERBURY-FARREL



The floor type spooler, shown above, is furnished in two sizes and is intended for the heavier gauges. . . . . The spooling attachment illustrated at the right is for use with intermediate and fine wire drawing machines and is furnished in three standard sizes.

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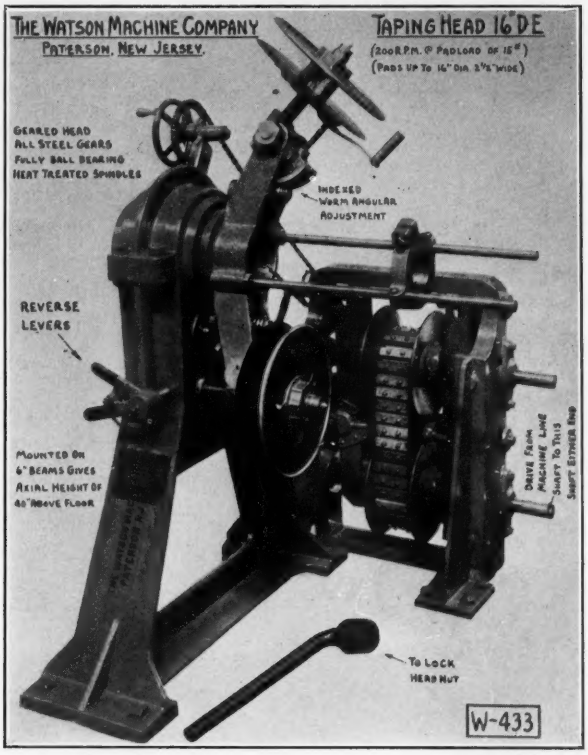
ECCENTRIC TAPING HEADS



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Angular and Spacing Adjustments simply and quickly made.

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WATSON MACHINE COMPANY PATERSON NEW JERSEY
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W618

ELECTRICAL WIRE and CABLE—WIRE ROPE and CORDAGE MACHINERY

Morgan-Connor Wire Machines (air-cooled) on High Carbon Wire

Number of blocks in service

Type A - - -	72
Type B - - -	100
Type C - - -	145
Type D - - -	7
Total	324

Number of plants involved -

Rope wire - - -	12
Spring wire - -	4
Total	16

Number of mills that have accepted machines, after trial - - - 11

Accepted and ordered more - - - - - - - - -	6
Accepted and need no more capacity - - - - - - -	2
Accepted and negotiating for more machines - - - -	3

Number of mills now experimenting - - - - - - - - -	4
Number of mills reporting failure - - - - - - - - - -	1
Total	16

MORGAN CONSTRUCTION CO.,
Worcester, Mass., U. S. A.

Sole licensee for Morgan-Connor Wire Machines in Europe

MALMEDIE & COMPANY

Maschinenfabrik Aktiengesellschaft — Dusseldorf, Germany

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